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NSY PORTSMOUTH
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FINAL MEMORANDUM FOR OPERABLE UNIT 4 (OU 4) RESULTS FOR CONFIRMATION SOIL SAMPLING WITHIN BUILDING 178 INTERTIDAL AREA NSY PORTSMOUTH ME

7/15/2013

TETRA TECH

Tetra Tech

Memorandum

To: Bryan Peed, NAVFAC MIDLANT

From: Deborah Cohen, Tetra Tech

Date: July 15, 2013

Re: Operable Unit 4 Results for Confirmation Soil Sampling within Building 178 Intertidal Area

Contract/CTO Number: N62470-08-D-1001/WE37

Introduction. Confirmation sampling of soil underlying sediment that was removed within the Building 178 intertidal area within MS-12A was conducted on April 26, 2013 in accordance with the April 2013 Field Task Modification Request Form (FTMRF). This memorandum provides the results of the sampling. The FTMRF is provided as Attachment 1. Field notes and sampling log sheets are provided as Attachment 2. A database printout is provided in Attachment 3, along with a CD containing the data validation report and electronic database. Photographs showing the sampling locations inside the building and conditions after sediment removal outside Building 178 are provided in Attachment 4. Figure 1 shows the conditions observed and the approximate sample locations. Figure 2 shows the relative location of the sampling area within Building 178 and the remaining area of contaminated sediment at MS-12A.

Sampling Activities. As presented in the FTMRF, the intertidal area within Building 178 was separated into Areas 1 through 4 for sampling of soil, if present. Separate soil samples were to be collected from the northern and southern portions of each area. Therefore, a maximum of eight soil samples were proposed from within the building, with each sample being a five-point composite.

Before sampling began, a trowel was used to check whether there was a minimum soil depth of 3 inches in each area. It was determined that the extent of concrete was much larger than originally observed, and was much larger than what was shown on Drawing 3 of the FTMRF. The northern portion of the four areas consisted mostly of concrete. Soil was less than 3 inches deep in these areas. Most of the southern portions had concrete and/or cobble. However, in the southern portions there were some

locations in Areas 1, 2, and 4 where there was soil with a depth of 3 inches or greater. Therefore, samples were collected from Areas 1S, 2S, and 4S. Based on the limited amount of soil in these three areas, three composite points were collected for each sample instead of the five proposed in the FTMRF. Table 1 provides a description of each area.

Table 1: Description of Building 178 Intertidal Area Soil Samples

Area	Sample Location	Sample Number	Sample Depth	Description
1	OU4-M12-1N	Not Collected	Not Applicable	The northern portion of Area 1 is mostly concrete slab. Soil was less than 3 inches in this portion so no sample was collected.
	OU4-M12-1S	OU4-SS-M12-1S	0 to 6 inches	Soil was collected from cut outs in the concrete slab across the southern portion of Area 1. Soil collected from three locations was composited into one sample. The soil consisted of sand and gravel with trace silt.
2	OU4-M12-2N	Not Collected	Not Applicable	The northern portion of Area 2 is mostly concrete slab. Soil was less than 3 inches in this portion so no sample was collected.
	OU4-M12-2S	OU4-SS-M12-2S	0 to 6 inches	Soil was collected from three locations and composited into one sample. One location was a cut out in the concrete slab and the other two were from a trough of exposed soil. The soil consisted of sand and gravel with little to trace silt.
3	OU4-M12-3N	Not Collected	Not Applicable	The northern portion of Area 3 is mostly concrete slab. Soil was less than 3 inches in this portion so no sample was collected.
	OU4-M12-3S	Not Collected	Not Applicable	Non-concrete parts of the southern portion of Area 3 contained primarily cobbles and boulders. Soil was less than 3 inches in this portion so no sample was collected.
4	OU4-M12-4N	Not Collected	Not Applicable	The northern portion of Area 4 is mostly concrete slab. Soil was less than 3 inches in this portion so no sample was collected.
	OU4-M12-4S	OU4-SS-M12-4S	0 to 3 inches	Concrete or dense granular material (gravel, sand, cobbles) was present throughout most of the southern portion of Area 4. Soil deeper than 3 inches was not present; therefore, the samples were collected from 0 to 3 inches. Soil was collected from three locations and composited into one sample. The soil consisted of sand and clayey silt/silty clay, with little to trace gravel.

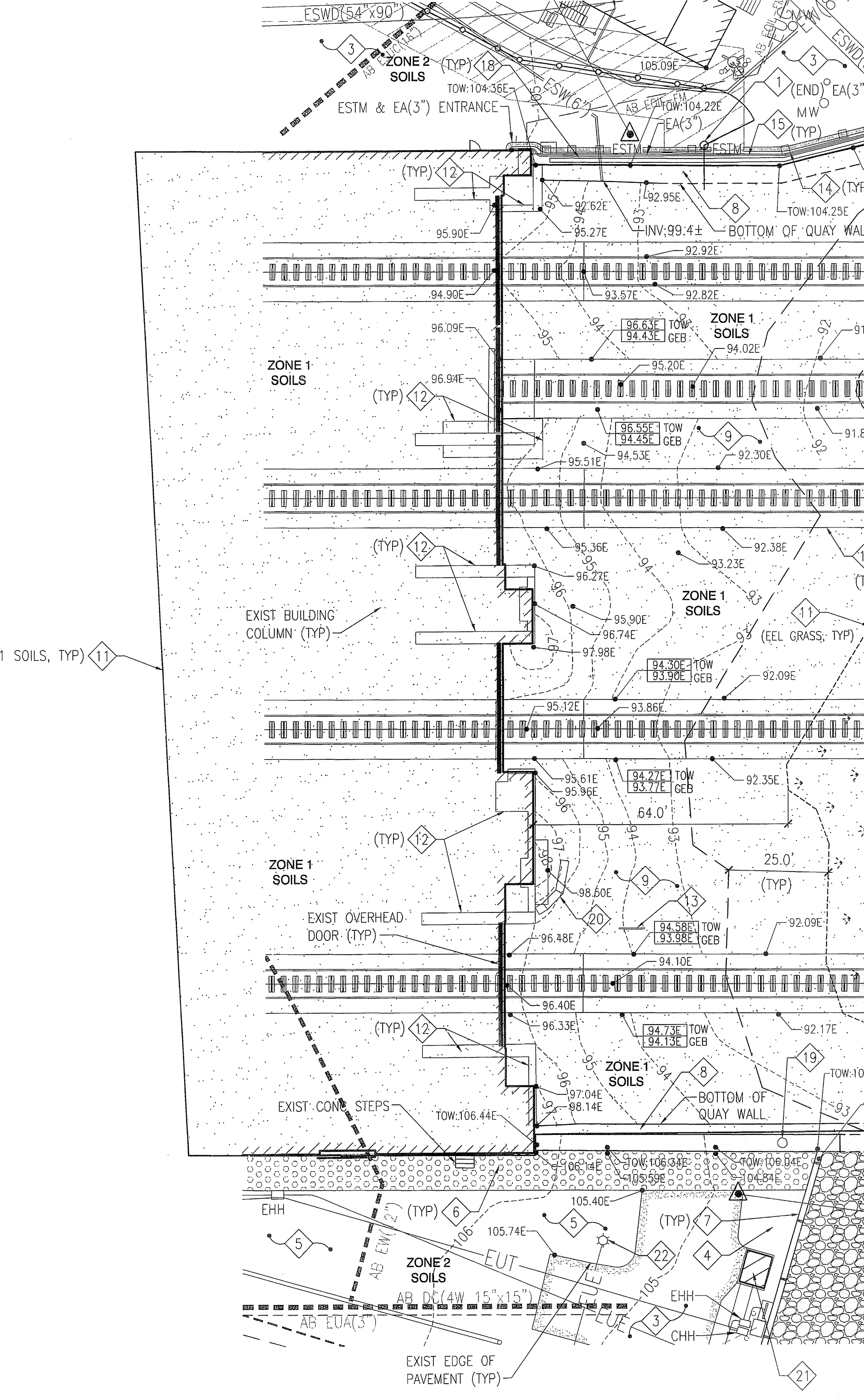
Analytical Results. Samples were analyzed by Katahdin Analytical Services for lead, acenaphthylene, anthracene, fluorene, and high molecular weight (HMW) polycyclic aromatic hydrocarbons (PAHs) [benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene]. The analytical results are provided in Table 2 along with the soil sampling action levels. The analytical database is provided on the CD included in Attachment 3. As shown on Table 2, there were no exceedances of action levels.

Table 2: Analytical Results for Building 178 Intertidal Area Composite Soil Samples

Parameter	Project Action Level (mg/kg)	Results (mg/kg)		
		OU4-SS-M12-1S	OU4-SS-M12-2S	OU4-SS-M12-4S
Lead	4,360	3,520 J	723 J	2,190 J
Acenaphthylene	2.1	0.012 U	0.13	0.1
Anthracene	12.4	6.7	2.1 J	6.4
Fluorene	5	4.5	1.5 J	3.7
HMW PAHs	130	61.0	24.0	79.4

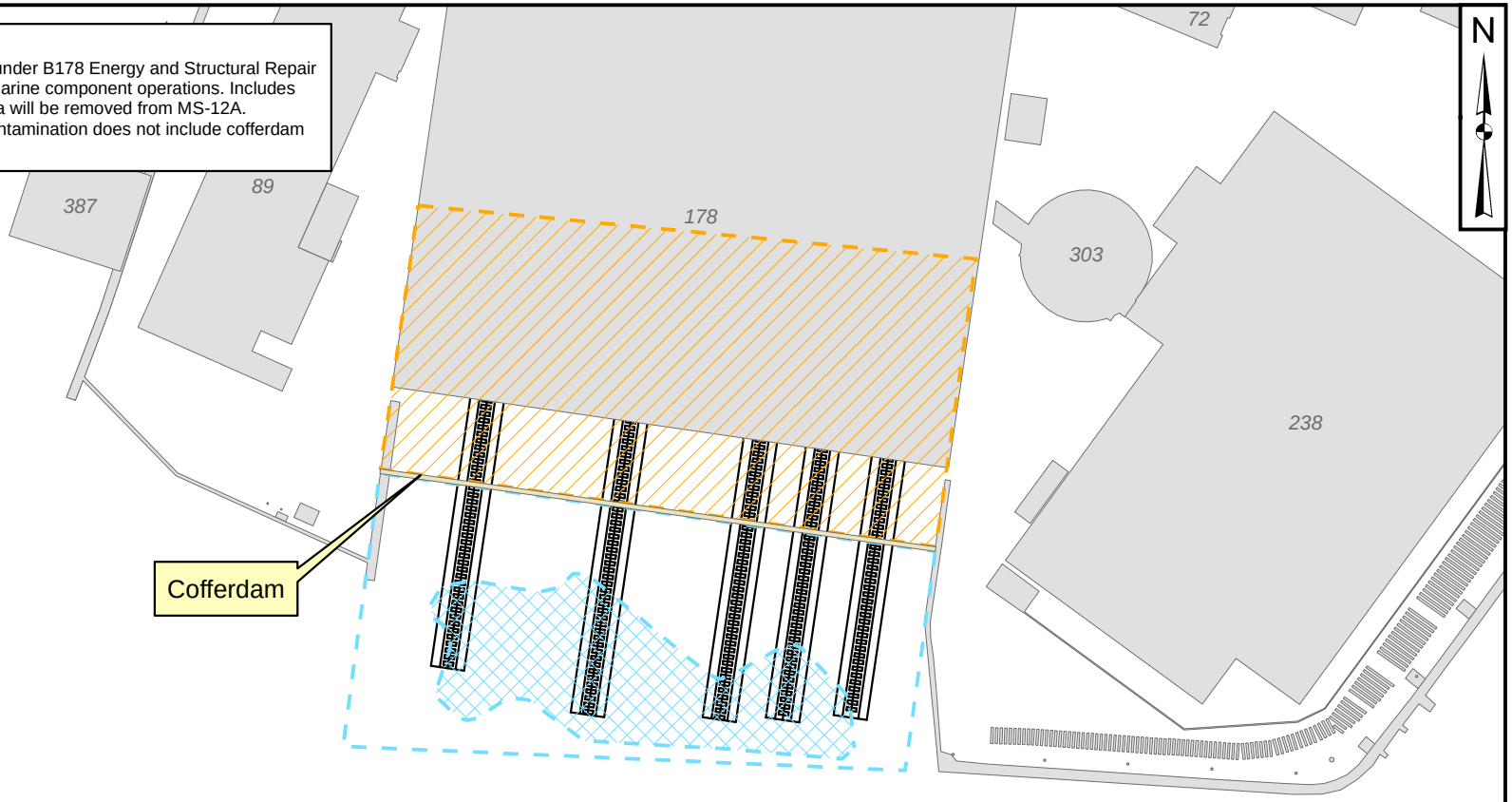
HMW PAHs are the summation of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene concentrations for each sample.

Conclusions. Sediment was removed from the intertidal area within Building 178 and the results of confirmation sampling show that underlying soil was not adversely impacted by contamination in the overlying sediment. Based on the removal of sediment and the confirmation sample results, potential unacceptable risks have been addressed within the Building 178 intertidal area.


ESWD(54"x90")
AB EUC(16")
ZONE 2 SOILS
(TYP) 18
TOW:104.36E
ESTM & EA(3") ENTRANCE
ESW(6")
AB EGIL-FM
105.09E
TOW:104.22E
EA(3")
ESTM
1 (END) EA(3")
MW
3
15 (TYP)
ESWD
(TYP) 12
14 (TYP)
92.62E
92.95E
8
TOW:104.25E
95.90E
95.27E
INV:99.4±
BOTTOM OF QUAY WALL
92.92E
94.90E
93.57E
92.82E
96.09E
96.63E TOW
94.43E GEB
ZONE 1 SOILS
94.02E
95.20E
96.94E
96.55E TOW
94.45E GEB
9
94.53E
92.30E
95.51E
91.8
95.36E
92.38E
93.23E
96.27E
EXIST BUILDING COLUMN (TYP)
95.90E
96.74E
97.98E
11 (EEL GRASS, TYP)
1 SOILS, TYP) 11
94.30E TOW
93.90E GEB
92.09E
95.12E
93.86E
95.61E
95.96E
94.27E TOW
93.77E GEB
92.35E
64.0'
25.0' (TYP)
98.60E
20
13
EXIST OVERHEAD DOOR (TYP)
94.58E TOW
93.98E GEB
96.48E
92.09E
94.10E
96.40E
96.33E
94.73E TOW
94.13E GEB
92.17E
19
97.04E
98.14E
EXIST CONC STEPS
TOW:106.44E
TOW:106.34E
TOW:106.04E
106.14E
105.59E
104.84E
EHH
(TYP) 6
105.40E
5
(TYP) 7
105.74E
22
4
AB EW(2")
EUT
EUE
AB DC(4W 15"x15")
AB EUA(3")
EHH
CHH
EXIST EDGE OF PAVEMENT (TYP)
21

PGH P:\GIS\PORTSMOUTH_NSY\MAPDOCS\MXD\MONITORING SITE MAPS\MS-12A_SEDIMENT_REMOVAL_2013.MXD 06/28/13 JEE

Notes:
1) Sediment removed under B178 Energy and Structural Repair to consolidate submarine component operations. Includes cofferdam. This area will be removed from MS-12A.
2) Limit of sediment contamination does not include cofferdam or eelgrass bed.



Legend

- Contaminated Sediment Removed in 2013 (See Note 1)
- Approximate Limit of Sediment Contamination (See Note 2)
- Eelgrass Bed (See Note 2)

80 0 80 Feet

DRAWN BY: J. ENGLISH	DATE: 06/20/13	TETRA TECH	CONTRACT NUMBER: 2100 / CTO NUMBER: WE13
CHECKED BY: D. COHEN	DATE: 06/28/13	MS-12A SEDIMENT REMOVAL AREA PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY: — DATE: —
REVISED BY: —	DATE: —		APPROVED BY: — DATE: —
SCALE: AS NOTED			FIGURE NO.: FIGURE 1 / REV: 0

ATTACHMENT 1

APRIL 2013 FIELD TASK MODIFICATION REQUEST FORM

TETRA TECH
FIELD TASK MODIFICATION REQUEST FORM

IOM/PNS	**CTO WE37, 112G03685**	**01**
Project/Installation Name	CTO & Project Number	Task Mod. Number
IOMP for OU4, Revision 1	**MS-12/Bldg 178 intertidal area**	**4/19/13, revised 4/23/13**
Modification To (e.g. Work Plan)	Site/Sample Location	Date

Activity Description: Confirmation sampling of soil underlying sediment, which was removed from within the intertidal portion of Building 178 within MS-12. Additional information on the sampling, analytical requirements, and decisions to be made based on the data are provided in Attachment A. The updated Health and Safety Plan is provided separately.

Reason for Change: Concrete, bedrock, or blast rock with very little fine-grained material was presumed to underlie sediment in the portion of MS-12 within Building 178. After removal of sediment as part of a Shipyard construction project, bedrock or blast rock was found to underlie sediment in the western portion of the intertidal area within Building 178; however, fill material including soil was found to underlie sediment within the eastern portion of the intertidal area within Building 178. Confirmation sampling of this soil is necessary to determine whether the soil in has been impacted by overlying contaminated sediment. The concern for the residual soil is if chemicals of concern (COCs) are present in the soil at concentrations that could adversely impact offshore sediment if the contaminated soil eroded to the offshore area in the future through a failure of the building structure.

Recommended Disposition: Collect confirmation samples of the soil within the of the intertidal area within Building 178, analyze the samples for the MS-12 COCs, and compare the results to the sediment cleanup levels for OU4 after an allowance for mixing with the overlying fill material that will be placed there.

Technical Lead — Date: 4/23/13

Approved Disposition:

Project Manager (Signature) — Date: 4/23/13

Distribution:

Program/Project File – 112G03685~~2625~~
Project/Project Manager – Garth Glenn
Technical Lead –Aaron Bernhardt
Field Operation Leader/Sampler – Dabra Seiken
Facility Coordinator – Deborah Cohen
Navy RPM – Bryan Peed
PWD-ME – Matt Thyng
USEPA RPM
MEDEP RPM

ATTACHMENT A

Soil Sampling within Building 178 Intertidal Area at Operable Unit 4
Portsmouth Naval Shipyard, Kittery Maine

Background:

The proposed remedial action for MS-12 within Operable Unit 4 (OU4) includes removal of contaminated sediment within the intertidal area of Building 178 and on the ramp outside of Building 178. The Installation Restoration Program (IRP) site associated with the contaminated sediment outside of the building was affected by past releases from former industrial waste outfalls (Site 5, within OU4). Contaminated sediment apparently washed into the intertidal area within Building 178, where the area was open to incoming/outgoing tidal water.

As part of the Shipyard construction project for Building 178, sediment was removed from the intertidal area on the ramp within Building 178 and from a portion of the ramp outside Building 178, both of which are within OU4 MS-12. To support the Shipyard construction project, a cofferdam was placed outside of the sediment removal area to prevent river water from entering the construction area. Remaining contaminated sediment outside of the cofferdam (to the south) on the ramp outside of Building 178 will be remediated as part of OU4 (MS-12).

A concrete floor was presumed to underlie the sediment within the intertidal area within Building 178; however, post-removal, it was found that the majority of the ground surface was bedrock or fill material consisting of rock and soil (sand and gravel). Because the ground surface conditions inside the intertidal area of Building 178 differed from anticipated, United States Environmental Protection Agency (USEPA) requested the Navy to collect post-sediment removal confirmation samples of fill material containing soil underlying the removed sediment within Building 178.

The following provides information to support the soil sampling within the intertidal area of Building 178, and includes a discussion of pre- and post-sediment removal conditions, sampling and analytical requirements, and planned evaluation and decisions based on the soil sampling results. Except as discussed herein, the laboratory analytical requirements and sampling procedures provided in the Interim Offshore Monitoring Plan for Operable Unit 4 (IOMP), Revision 1 (Tetra Tech, November 2010) will be used. Updates to the health and safety plan for Round 12 of the IOMP (Tetra Tech, April 2011) are provided in Attachment B.

Pre-removal site conditions:

Sediment data for MS-12 from the Interim Offshore Monitoring Program are provided in the Feasibility Study (FS) Report for OU4 (Tetra Tech, September 2012). Sediment at MS-12 had concentrations of chemicals of concern (COCs) greater than OU4 sediment preliminary remediation goals (PRGs). The COCs are acenaphthylene, anthracene, fluorene, high molecular weight (HMW) polycyclic aromatic hydrocarbons (PAHs), and lead. As shown on figures in the FS, the maximum detection of lead was 41,600 mg/kg, with most detections less than 4,000 mg/kg (Figure 1-14); the maximum detection of HMW PAHs was 231,800 ug/kg, with most detections less than 50,000 ug/kg (Figure 1-15); and the maximum detection of fluorene was 14,000 ug/kg, with most detections less than 5,000 ug/kg (Figure 1-16). The maximum concentrations were detected in samples collected from sediment within the intertidal area inside the building. The estimated average thickness of sediment inside the building was 0.2 feet, although there were some piles of sediment/rocks that were a few feet thick in the intertidal area.

As part of pre-construction activities for Building 178, the Shipyard contractor collected two sediment samples inside the building and 12 sediment samples on the ramp outside the building. In addition, subsurface exploration borings were installed inside the building. Concentrations of PAHs and lead in the two samples inside the building and 12 samples on the ramp were generally in the range of concentrations presented in the FS Report. The borings showed granular fill material beneath concrete or sediment and overlying bedrock. The fill was described as medium dense to very dense mix of sand and gravel with silt. Within the intertidal portion of Building 178, bedrock was approximately 1 to 1.5 feet below ground surface (bgs) on the western side and 2 to 10 feet bgs on the eastern side. Pre-sediment removal ground surface elevations and bedrock elevations are marked on the attached Drawing 1 (shown

in PNS 2002 vertical datum). On the western intertidal portion, the elevation of bedrock slopes from north to south from approximately 99 to 96 feet PNS 2002. In the eastern portion, the elevation slopes from approximately 96 to 85 feet PNS 2002. The portion where more than 2 feet of fill was found overlying bedrock is within the hatched area on the drawing, where additional structural support will be needed to support the planned modifications to Building 178.

Post-removal conditions in intertidal area within Building 178:

As part of the Shipyard construction project within Building 178, material was removed until underlying concrete, bedrock, or rock was exposed or one foot of material was removed, whichever was shallower. Bedrock or rock was found to underlie sediment in the western portion of the intertidal area within Building 178; however, fill material consisting of sand and gravel was found to underlie sediment within the eastern portion of the intertidal area within Building 178. There are some areas of concrete at ground surface adjacent to the wooden tracks.

A post-sediment removal site walk was conducted on March 14, 2013 with Navy, USEPA, and Maine Department of Environmental Protection (MEDEP) representatives. On the western portion of the intertidal area in Building 178, bedrock or blast rock was observed to be shallow with a few inches (1 to 2 inches) of soil/fill material. Bedrock outcrops were also observed in this area. On the eastern side, sand and gravel fill was observed in areas that may be more than a few inches thick.

Anticipated modifications to the intertidal area within Building 178:

The Shipyard construction project will include placement of structural fill to provide a level floor across most of the intertidal area. A seawall will be constructed so that river water will no longer be able to enter the building along most of the intertidal area. In the western-most bay, a concrete-lined berth will be constructed and this will be the only portion of the building that will be open to the river. As shown on the design drawing (see attached excerpt labeled drawing 2), in the intertidal portion of the building at least 6 feet of structural fill will be placed over the current ground surface in the eastern and central areas before placing a concrete floor to result in a floor elevation of 115 feet PNS 2002. For the portion immediately adjacent to the seawall, crushed stone will be placed from the bottom of the footer of the seawall to the concrete floor. A concrete-lined berth will cover the current ground surface in the western most area. For the concrete-lined berth construction, existing concrete, timber, soil, and bedrock will be removed to an elevation of 95 feet PNS 2002 under berth walls and elevation of 94 feet PNS 2002 under berth slab (as provided on the note in drawing WD101:178-13-351). Based on the elevation of bedrock as shown in the subsurface exploration borings, approximately one to five feet of bedrock may need to be removed to reach the design elevations for construction of the berth.

Potential future migration of soil and soil action levels for soil sampling:

Sediment has been removed from the building and there will be no exposed soil within Building 178 after completion of construction activities. The concrete-lined berth will be constructed on top of bedrock in the westernmost bay. Following full implementation of planned construction activities, there will be no remaining sediment and there will not be a complete exposure pathway to remaining soil within Building 178. Any remaining soil will be covered by structural fill and a concrete floor and therefore, would not be available for exposure or migration.

If the seawall was to fail and site soil (i.e., fill material underlying the sediment that was removed) was to erode to the offshore, it would mix with the overlying structural fill and offshore sediment. Therefore, to evaluate soil for potential offshore erosion under post-construction conditions, a minimum mixing factor of 10 was used to adjust the OU4 sediment PRGs to develop project soil action levels. Table 1 provides the project soil sample action levels.

TABLE 1
Project Action Levels for Soil Samples Collected within the Intertidal Area of Building 178

COC	Action Level for Soil (mg/kg)
Lead	4,360
Acenaphthylene	2.1
Anthracene	12.4
Fluorene	5
HMW PAHs	130

• HMW PAH values will be calculated by summing the following six PAHs, substituting one-half of the detection limits for non-detects: benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene.

Sampling and analytical requirements:

Each five-point composite soil sample will be collected from 0 to 6 inches bgs and analyzed for the MS-12 COCs (see Table 1). Sampling is not proposed for areas where there is 3 inches or less of site soil overlying bedrock or blast rock. For areas with less than 3 inches of soil, the ratio of site soil to the minimum amount of structural fill that will be placed (6 feet) is less than 5 percent; therefore, these areas will be considered insignificant from a potential migration standpoint and will not require sampling.

Based on observations made at the March 14, 2013 site walk, and boring logs for the area, the intertidal area inside the building has been broken up into four areas, as shown on Drawing 3. Areas 1 and 2 are on the eastern side of the building and at least 1 foot of soil is anticipated to exist above bedrock or blast rock. Area 4 is on the western side where bedrock is shallow. About one or two inches of soil above shallow bedrock has been observed in Area 4. For Area 3, bedrock appears to be shallow; however, borings are not available for this area. Based on regulatory request, each of the four areas will be divided into northern and southern portions, and composite sampling from the northern and southern halves of each area will be attempted.

In Areas 3 and 4, to determine if sampling is required, Tetra Tech will measure the approximate thickness of soil using a trowel or other device at various locations across the area and mark the results on a drawing. Soil thickness at the targeting sampling locations (four corners and center) will be measured to determine whether there is sufficient soil for sampling. The locations will be transferred to the drawing using line-of sight estimates in the field. Areas with greater than 3 inches of soil at three or more of the sub-locations will be sampled.

Based on borings for the area and the March 2013 site walk, the subsurface conditions across each area are expected to be similar. However, based on field conditions during sampling, Tetra Tech will determine whether sub-locations need to be moved, eliminated, or added or whether conditions may differ sufficiently across an area to warrant separate samples for portions of the area. Field changes will be communicated as soon as possible after sampling is completed.

Katahdin Analytical Services, Inc will conduct the analysis in accordance with the IOMP. The project quantitation level goals provided in Worksheet 15 of the IOMP are sufficient for this sampling; lower quantitation levels do not need to be used. Full data validation as provided in the IOMP will not be required for the soil results; however, the laboratory will provide a complete data package. Laboratory data will be reviewed for completeness before loading into the database.

Data evaluation:

The soil sample results will be compared to the Project Soil Sample Action Levels. If the concentrations are less than the action levels, no further action for soil within the intertidal area of Building 178 is required. If the concentrations exceed, further discussion will be held between the Navy and USEPA to determine whether a risk assessment or further action is needed.

Sample nomenclature:

The composite samples will be labeled OU4-SS-M12-1 through OU4-SS-M12-4, with the last number indicating which area the sample was collected from (i.e., Area 1 through 4). "N" or "S" will be added to the Area # to indicate whether it was collected from the northern or southern portion of the area. For example, a composite sample from the southern portion of Area 1 would be labeled "OU4-SS-MS12-1S".

Analytical Requirements:

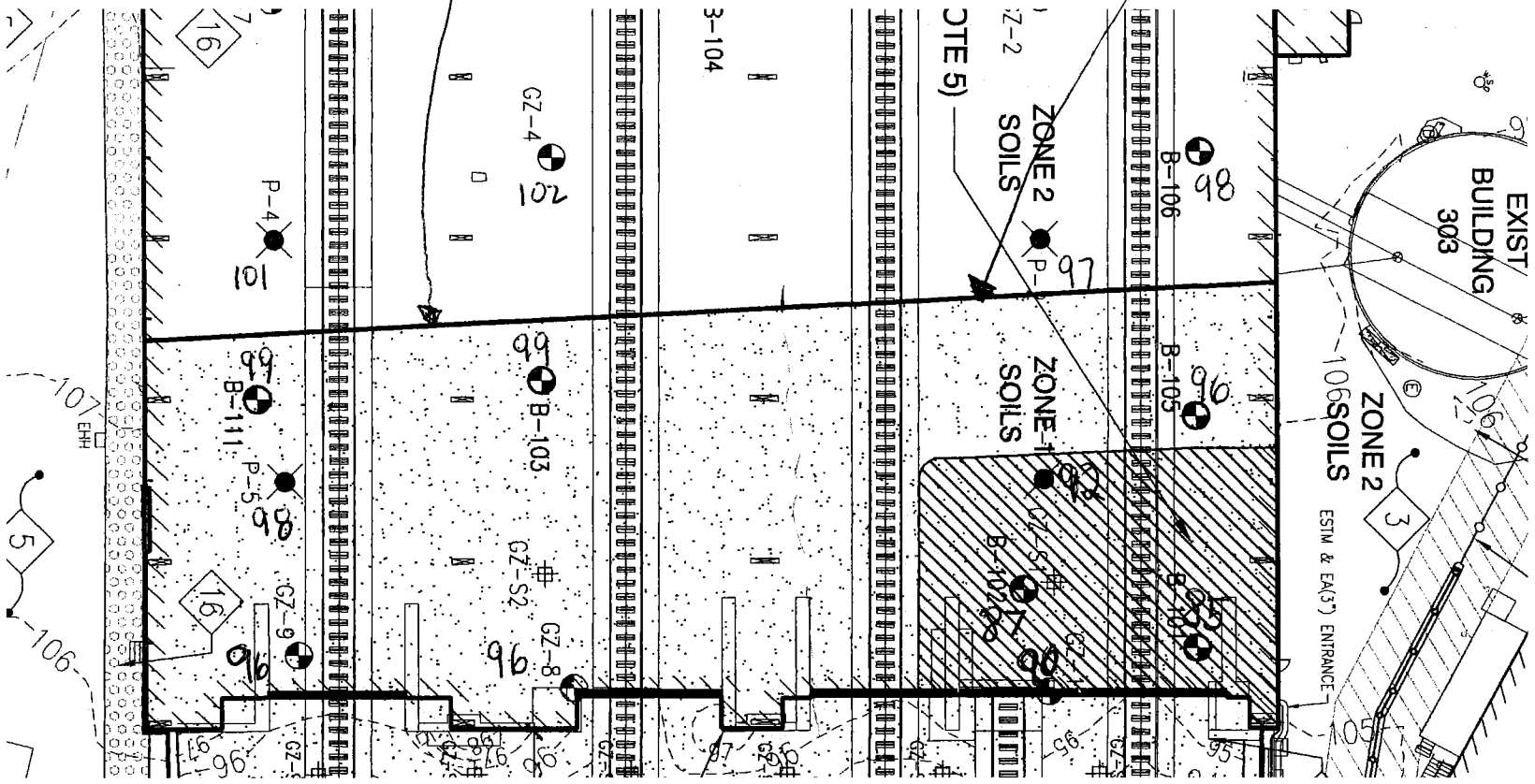
One composite soil sample will be collected from each half of the areas where there is sufficient soil. Because of the limited number of samples and type of analyses, no duplicate samples or rinsate blanks will be collected.

Analyte	CAS Number	Recommended Project QL Goal (From SAP)
PAHs (ug/kg)		
ACENAPHTHYLENE	208-96-8	70
ANTHRACENE	120-12-7	412
BENZO(A)ANTHRACENE (HMW PAH)	56-55-3	87
BENZO(A)PYRENE (HMW PAH)	50-32-8	143
CHRYSENE (HMW PAH)	218-01-9	128
DIBENZO(A,H)ANTHRACENE (HMW PAH)	53-70-3	21
FLUORANTHENE (HMW PAH)	206-44-0	200
FLUORENE	86-73-7	167
PYRENE (HMW PAH)	129-00-0	222
METALS (mg/kg)		
LEAD	7439-92-1	142

N

Observation during March 14 2013 Site Walk: Bedrock shallow, only a few ~~feet~~ inches of soil/fill; bedrock outcrops observed

Observation during March 14, 2013 Site Walk: Sand/Gravel fill, may be more than several inches in portions of this area



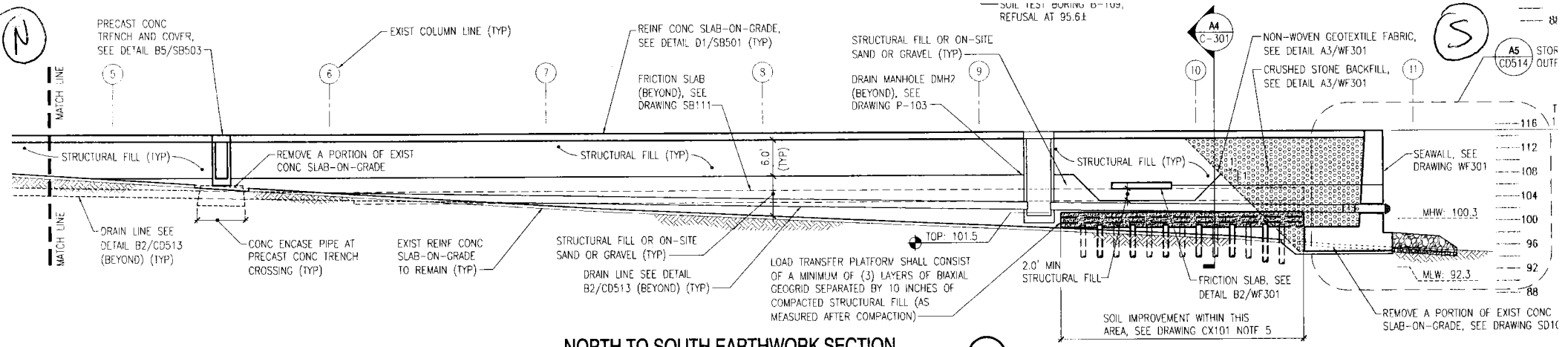
W

E

Approximate elevation of bedrock, PNS 2002 Vertical Datum, ft

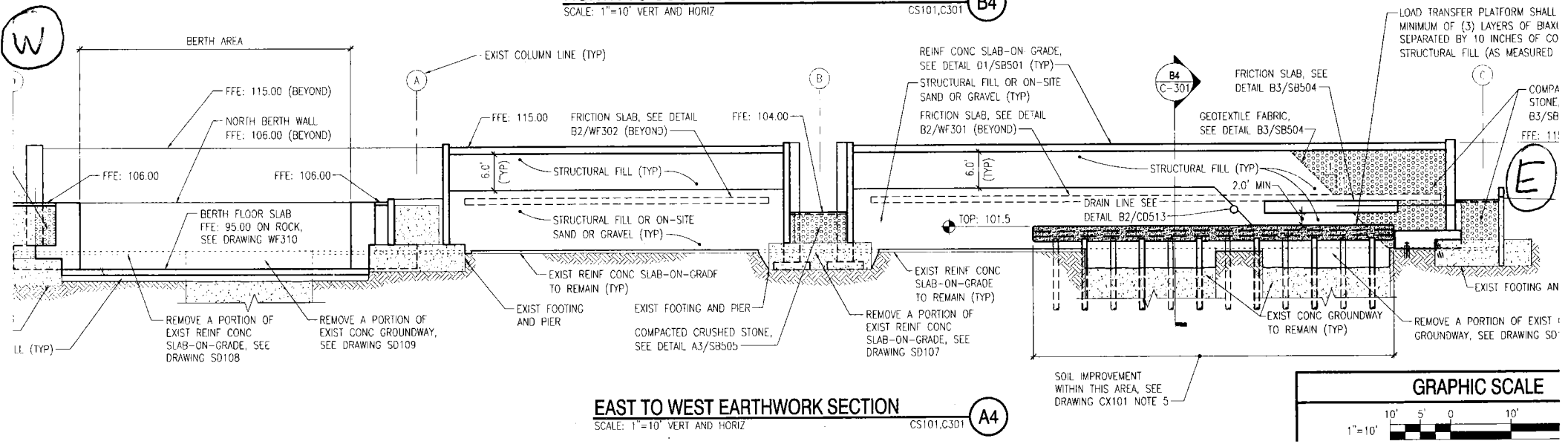
S

From Building 178 Energy Conservation And Structural Repair Existing Condition Plan
CX101-178-13-331 2/8/13



NORTH TO SOUTH EARTHWORK SECTION

SCALE: 1"=10' VERT AND HORIZ — CS101,C301 — B4

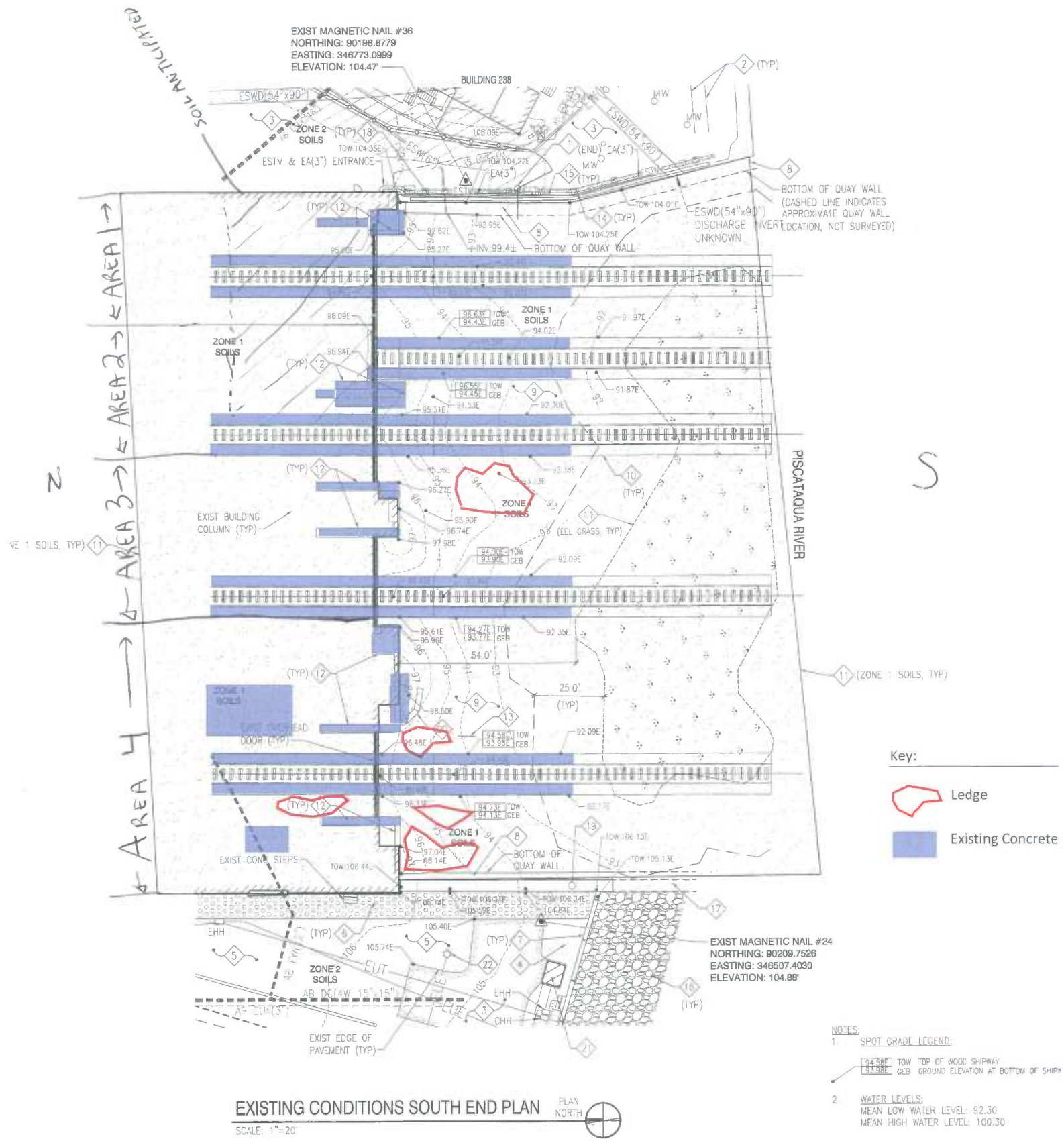


EAST TO WEST EARTHWORK SECTION

SCALE: 1"=10' VERT AND HORIZ — CS101,C301 — A4

From Building 178 Energy Conservation and Structural Repair Earth work Sections Through Building 178
C-3 - 178-13-3,3,5 2/08/13

DRAWING- 3



EXISTING CONDITIONS SOUTH END PLAN

PLAN NORTH

SCALE: 1"=20'

ATTACHMENT 2

APRIL 26, 2013 SAMPLE LOG SHEETS AND FIELD NOTES

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: B178 PWSY
Project No.: 112603685

Sample ID No.: OU4-SS-M12-15
Sample Location: Area 1, South
Sampled By: D. Seiker
C.O.C. No.:

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
4/26/13	0915	SE: 0'-2"	brown & black	moist-wet f.-c. SAND, little Gravel, trace Silt, small quantities of wood
Method: Composite		NE: 0'-6"	brown & black	moist f.-c. SAND, little Gravel, trace Silt.
Monitor Readings (Range in ppm):	0930	NW: 0"-6"	brown	moist gravel and some f.-c. Sand, trace Silt
	0935	placed mixed sample in jar		

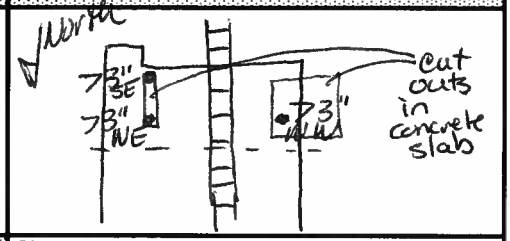
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
PAHs (8270D); Lead (6010C)	1 glass	1 glass	n/a

OBSERVATIONS / NOTES:

- Area 1 mostly all concrete slab
- No areas to sample in 1N.
- Took samples from cut outs in concrete slab in 1S.
- Avoided sampling below 2" in SE subsample b/c free was coming in and was saturated

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: B178 PNSY
Project No.: 112603685

Sample ID No.: Q44-SS-M12-2S
Sample Location: Area 2, South
Sampled By: D Seiken
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
4/26/13	08:45 SE	0-6"	brown & black	moist, f-c. SAND, some Gravel, little clayey Silt
Method: Composite	SW	0-6"	reddish brown	moist, f-c. SAND, little Gravel
Monitor Readings (Range in ppm):	0905 NW	0-6"	brown w/ orange & black	moist, f-c. SAND and GRAVEL, trace Silt.
	0910	Sample in jar		

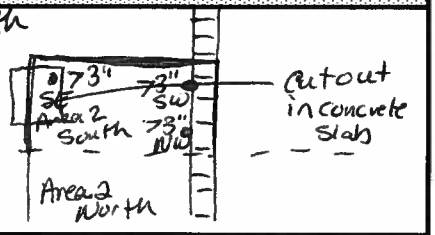
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
PAHs (8270D); Lead (6010C)	1 glass	1 glass	n/a

OBSERVATIONS / NOTES:

Area 2N, lots of concrete slab, cleared no sample locs.

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: B178 PHASE 4
Project No.: 112G03685

Sample ID No.: 044-SS-MD-45
Sample Location: Area 4 / South
Sampled By: D. Seiken
C.O.C. No.:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
4/26/13	07:30 SE:	0-3"	dk br. - black	wet, f-c. SAND, little Gr., tr.-little clayey silt, Trace wood.
Method: Composite		mid: 0-3"	greyish black	wet, f. SAND and clayey Silt., trace Gravel
Monitor Readings (Range in ppm):	07:45	SE: 0-3"	dk brown	wet, Silty Clay, some little f. sand,
	07:50	Sample Composited	and in jar	

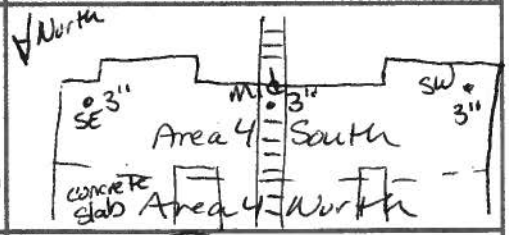
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
PAHs (8270D) Lead (6010C)	1, glass	1, glass	n/a

OBSERVATIONS / NOTES:

The vast majority of Area 4N is cleared concrete. Struggled to find 3 locs. w/in Area 4S to sample. Most non-concrete areas are dense, granular material (gravel, sand, cobbles)

MAP:

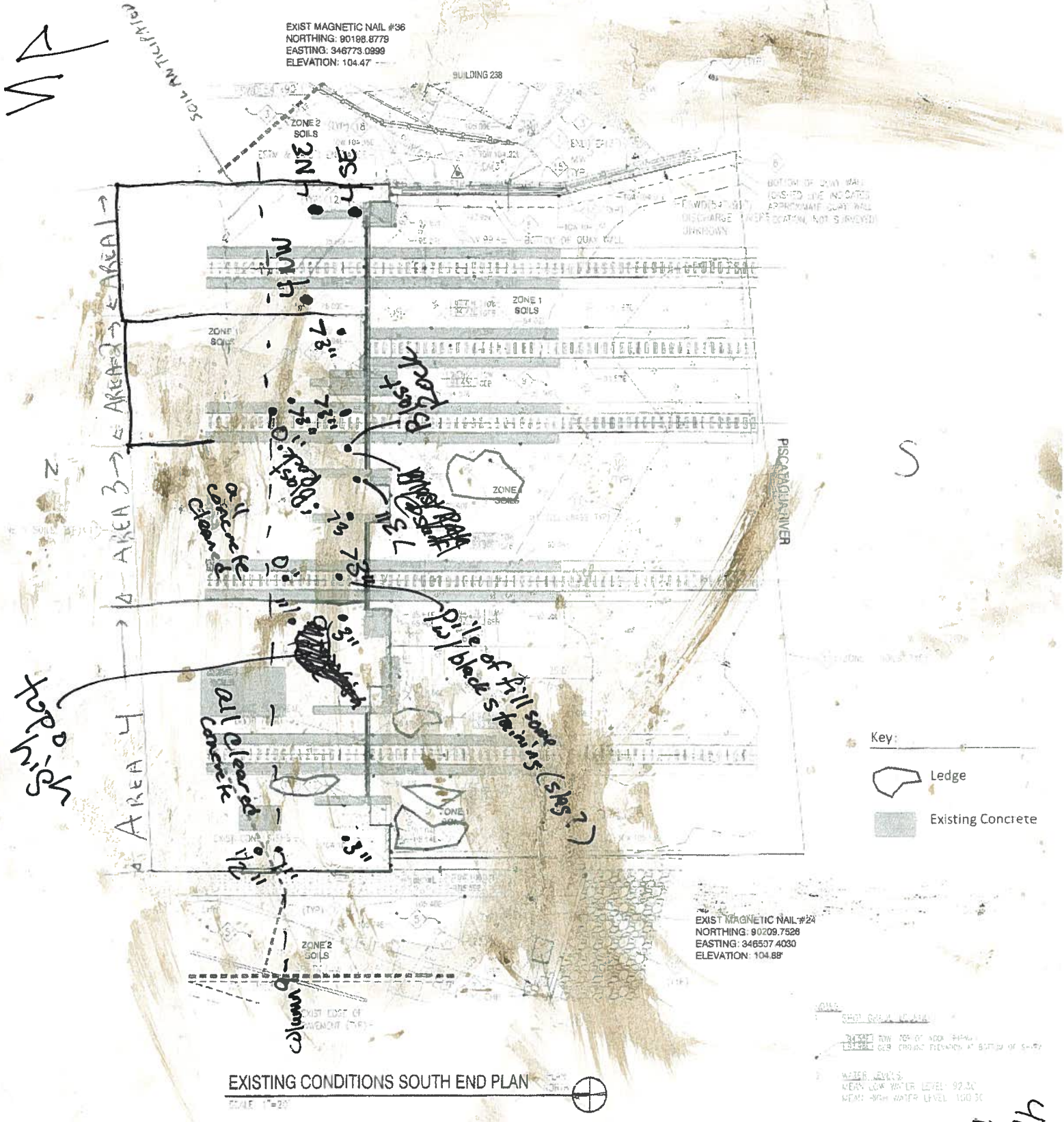


Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

DRAWING-3



4/26/13
DSeiken
Field Map

instills confidence

NM - no sed left, what is media
- dont want to be sampling a different media

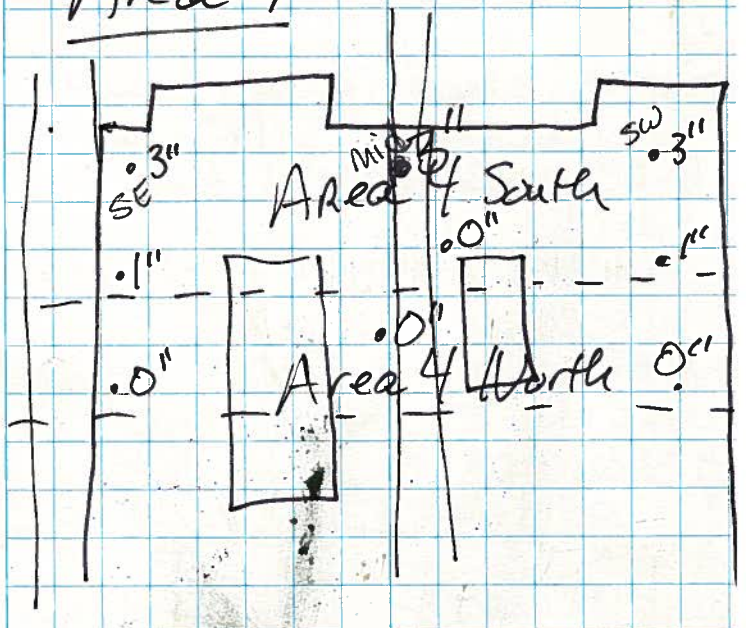
MA - still need LUCs
what if there is a catastrophic failure of the seawall? Then the sed/soil remobilized back into the habitat. If we don't know what is there, how do we know that isnt a risk. Either do that or show w/ data there is no risk.

- How do we know there is no sediment there. It might be there and we can't see it.

LM - So maybe grain size analysis would be enough to show

B178 Pusy Inside Sampling 4/26/13
D. Seiken
6:00 - On Site
~~Area 4~~ w/ Rick Frye

Area 4



North

7:30 to 7:45 collect sample in Area 4

a) SW - Comp Sub sample
dk brown - black wet
f.-c. SAND, ~~some~~ little gravel
tr. - little clayey silt, wood frag

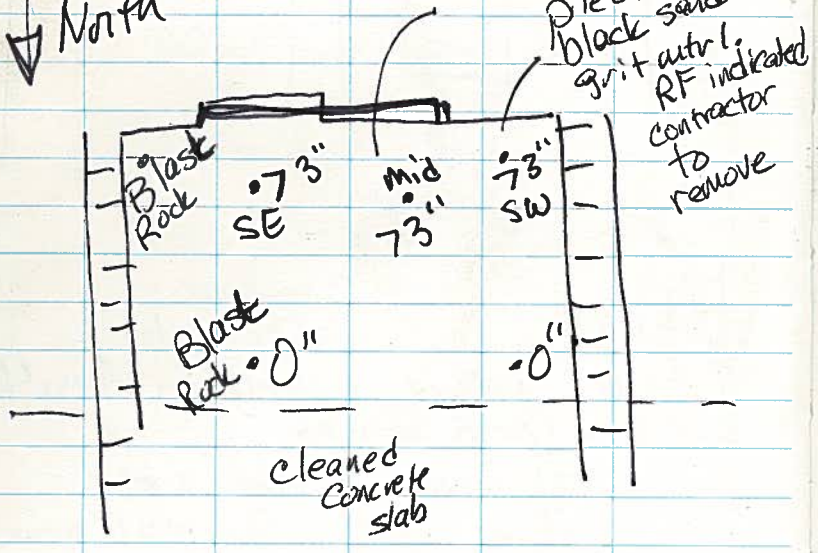
b) Mid Composite sub-sample
odor Greyish black, wet f. sand, and clayey silt, tr. gravel

c) SE composite sub-sample
dk brown wet silty clay
some-little f. sand

mixed thoroughly - in jar

Area 3

North



SW - this is the side of the area where there is a topography Δ it slopes up ~2-3' going from east to west. (Rick took photo) This had some sand blast grit (likely) black sandy mtrl. RF said he would have them Ecc/Enpro remove ~~on~~ the pile that ~~has~~ has sand blast mtrl. in it. So, ~~there~~ I spoke to Aaron B. - don't sample where they will remove.

Mid - this is a small pile of fines + wood mixed on top of concrete

nothing to sample in Area 3

Area 2

Sampled 3 sub-areas btwn 0845-0905

SE subsample – collected from cut-out in concrete slab
Moist
Brown and black, ~~gravel~~ and f-c Sand, some Gravel little clayey silt

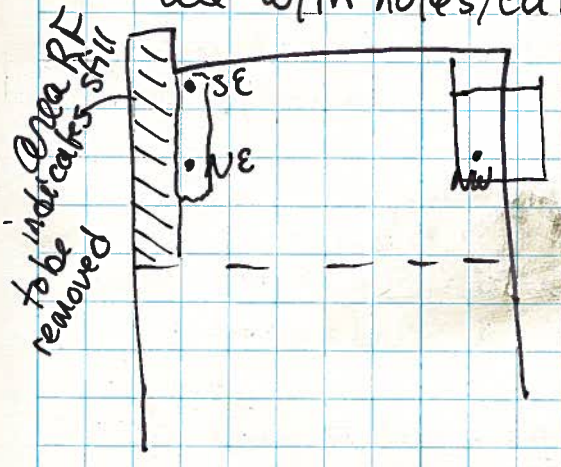
SW – subsample
Moist
reddish brown f-c. Sand little gravel

NW subsample
brown w/ orangish and black areas, moist, f-c. Sand and Gravel, tr. silt

mixed thoroughly
0910 - in jar

Area 1

Sample 3 - sub areas all w/in holes/cut outs of the concrete slabs



there is a small pile of sediment in cut-out near SE sub-sample. KF indicated it was pushed there from concrete. He will have ECC/Enpro remove pile. Dimensions ~3'x2'

(saturated)

SE subsample — moist
brown & black f-c. sand
little gravel, trace silt
small amts of wood

glass observed while dissing

WE subsample
same as SE subsample
but not saturated beneath
2"

WW subsample — moist
brown gravel and - some
f.-c. sand, tr. silt

mixed, put in jars 9:35

Collecting sub samples
9:15 - 9:30

661 Anderson Dr Foster Plaza 7
Pitts PA 15220
412·921·7090
CTO WE37

010:00 Rick drove me off base
011:30 Katahdin pick up samples

ATTACHMENT 3

SAMPLE DATABASE PRINTOUT AND CD WITH DATA VALIDATION REPORT AND ELECTRONIC DATABASE

OU4 Monitoring Station 12
Building 178 Intertidal Area Confirmation Sampling
Portsmouth Naval Shipyard, Kittery, Maine

LOCATION	**OU4-M12-1S**	**OU4-M12-2S**	**OU4-M12-4S**
SAMPLE ID	**OU4-SS-M12-1S**	**OU4-SS-M12-2S**	**OU4-SS-M12-4S**
SAMPLE DATE	**20130426**	**20130426**	**20130426**
SAMPLE CODE	**NORMAL**	**NORMAL**	**NORMAL**
MATRIX	**SO**	**SO**	**SO**
SAMPLE TYPE	**NORMAL**	**NORMAL**	**NORMAL**
SUBMATRIX	**SS**	**SS**	**SS**
TOP DEPTH (IN)	**0**	**0**	**0**
BOTTOM DEPTH (IN)	**6**	**6**	**3**
METALS (MG/KG)			
LEAD	3520 J	723 J	2190 J
MISCELLANEOUS PARAMETERS (%)			
TOTAL SOLIDS	74	76	59
POLYCYCLIC AROMATIC HYDROCARBONS			
ACENAPHTHYLENE	12 U	130	100
ANTHRACENE	6700	2100 J	6400
BENZO(A)ANTHRACENE	5800	3400	10000
BENZO(A)PYRENE	1400 J	2100 J	7500
CHRYSENE	6400	3400	11000
DIBENZO(A,H)ANTHRACENE	400 J	210	890 J
FLUORANTHENE	31000	8400	26000
FLUORENE	4500	1500 J	3700
PYRENE	16000	6500	24000 J

Tetra Tech **INTERNAL CORRESPONDENCE**

TO:	**D. COHEN**	**DATE:**	**MAY 20, 2013**
FROM:	**TERRI L. SOLOMON**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – LEAD, PAHs, TOTAL SOLIDS**
CTO WE37 PORTSMOUTH NSY
SAMPLE DELIVERY GROUP (SDG) – SG2820

SAMPLES: 3/Soil

OU4-SS-M12-1S OU4-SS-M12-2S
OU4-SS-M12-4S

Overview

The sample set for Portsmouth NSY, CTO WE37, SDG SG2820, consists of three (3) environmental soil samples. No field duplicate pairs were included within this SDG.

All samples were analyzed for select polycyclic aromatic hydrocarbons (PAHs), namely acenaphthylene, anthracene, benzo(a)pyrene, benzo(a)anthracene, chrysene, dibenzo(a,h)anthracene, flouranthene flourene, and pyrene, lead and total solids. The samples were collected by Tetra Tech on April 26, 2012 and analyzed by Katahdin Analytical Services. PAH analyses were conducted using SW-846 method 8270D via Selective Ion Monitoring (SIM). Lead analyses were conducted using SW-846 method 6010C. Total solids analyses were conducted using Standard Method 2540G.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
• Initial and Continuing Calibrations
• Laboratory Method / Preparation Blanks
* • ICP Interference Analysis
* • Laboratory Control Sample Recoveries
* • Matrix Spike Recoveries
• Laboratory Duplicate Results
* • ICP Serial Dilution Results
* • Surrogate Recoveries
• Internal Standard Recoveries
* • Detection Limits
* • Analyte Quantitation

* - All quality control criteria were met for this parameter.

Qualified (if applicable) analytical results are summarized in Appendix A. Results as reported by the laboratory are presented in Appendix B. Appendix C contains Region I worksheets. Appendix D contains the documentation to support the findings as discussed in this validation report.

Initial and Continuing Calibrations

The continuing calibration percent drift (%D) on 05/10/13 at 15:35 on instrument GCMS-G for pyrene was > 20% quality control limit affecting the dilution of sample OU4-DD-M12-4S. The positive result reported for pyrene was qualified as estimated, "J".

Laboratory Duplicate Results

The laboratory duplicate relative percent difference (RPD) was > 35% quality control limit for lead. The positive results reported for lead were qualified as estimated, "J".

Internal Standard Recoveries

The internal standard recovery for perylene-D12 was greater than the quality control limit for the dilution of sample OU4-SS-M12-1S (analyzed on 5/14/13). The detected result for benzo(a)pyrene was qualified as estimated, "J".

Sample Quantitation

Sample OU4-SS-M12-1S was originally analyzed at a 1X dilution. All sample results with the exception of acenaphthylene were above the linear calibration range of the instrument. The sample was reanalyzed at a 140X dilution. The sample result for dibenzo(a,h)anthracene was nondetected in the diluted sample. Therefore, the undiluted result for dibenzo(a,h)anthracene was used for validation purposes and was qualified as estimated, "J", as a result of linear range exceedence. All remaining detected results were used from the dilution analysis.

Notes

Positive results less than the limit of quantitation (LOQ) but greater than the method detection limit (MDL) were qualified as estimated, "J".

Nondetected results were reported to the limit of detection (LOD).

The following contaminant was detected in the laboratory preparation blank at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Lead	0.197 mg/kg	0.985 mg/kg

An action level of 5X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. No validation actions were warranted as all sample results were greater than the action level.

All samples were analyzed at dilutions because of high PAH concentrations. Results from the undiluted and diluted analyses were combined to report sample results. The samples and dilutions are listed below:

Sample	Dilution(s)
OU4-SS-M12-1S	140X
OU4-SS-M12-2S	100X
OU4-SS-M12-4S	100X

Executive Summary

Laboratory Performance: The continuing calibration %D on 05/10/13 at 15:35 for pyrene was > 20% quality control limit. The laboratory duplicate relative percent difference (RPD) was > 35% quality control limit for lead. Several compounds exceeded the linear range of the instrument.

Other Factors Affecting Data Quality: Positive results less than the LOQ but greater than the MDL were qualified as estimated.

The data for these analyses were reviewed with reference to the EPA Region I, "National Functional Guidelines for Inorganic Review", November 2008, Region I EPA "Data Validation Functional Guidelines - Part II" (12/96) and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories", October 2010.

The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Terri L. Solomon
Environmental Scientist

Tetra Tech
Joseph A. Samchuck
Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C – Region I Worksheets
4. Appendix D – Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed

PROJ_NO: 03685	NSAMPLE	OU4-SS-M12-1S			OU4-SS-M12-1SDL2			OU4-SS-M12-2S			OU4-SS-M12-2SDL2		
SDG: SG2820	LAB_ID	SG2820-3			SG2820-3DL2			SG2820-2			SG2820-2DL2		
FRACTION: PAH	SAMP_DATE	4/26/2013			4/26/2013			4/26/2013			4/26/2013		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/KG			UG/KG			UG/KG			UG/KG		
	PCT_SOLIDS	74.6			74.6			76.4			76.4		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACENAPHTHYLENE		12	U					130					
ANTHRACENE					6700						2100	J	P
BENZO(A)ANTHRACENE					5800						3400		
BENZO(A)PYRENE					1400	J	NP				2100	J	P
CHRYSENE					6400						3400		
DIBENZO(A,H)ANTHRACENE		400	J	L				210					
FLUORANTHENE					31000						8400		
FLUORENE					4500						1500	J	P
PYRENE					16000						6500		

PROJ_NO: 03685	NSAMPLE	OU4-SS-M12-4S			OU4-SS-M12-4SDL		
SDG: SG2820	LAB_ID	SG2820-1			SG2820-1DL		
FRACTION: PAH	SAMP_DATE	4/26/2013			4/26/2013		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	UG/KG			UG/KG		
	PCT_SOLIDS	58.9			58.9		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACENAPHTHYLENE		100					
ANTHRACENE					6400		
BENZO(A)ANTHRACENE					10000		
BENZO(A)PYRENE					7500		
CHRYSENE					11000		
DIBENZO(A,H)ANTHRACENE					890	J	P
FLUORANTHENE					26000		
FLUORENE					3700		
PYRENE					24000	J	C

PROJ_NO: 03685	NSAMPLE	OU4-SS-M12-1S			OU4-SS-M12-2S			OU4-SS-M12-4S		
SDG: SG2820	LAB_ID	SG2820-003			SG2820-002			SG2820-001		
FRACTION: M	SAMP_DATE	4/26/2013			4/26/2013			4/26/2013		
MEDIA: SOIL	QC_TYPE	NM			NM			NM		
	UNITS	MG/KG			MG/KG			MG/KG		
	PCT_SOLIDS	74.6			76.4			58.9		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
LEAD		3520	J	F	723	J	F	2190	J	F

PROJ_NO: 03685	NSAMPLE	OU4-SS-M12-1S			OU4-SS-M12-2S			OU4-SS-M12-4S		
SDG: SG2820	LAB_ID	SG2820-3			SG2820-2			SG2820-1		
FRACTION: MISC	SAMP_DATE	4/26/2013			4/26/2013			4/26/2013		
MEDIA: SOIL	QC_TYPE	NM			NM			NM		
	UNITS	%			%			%		
	PCT_SOLIDS	74.6			76.4			58.9		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL SOLIDS		74			76			59		

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

Report of Analytical Results

Client: Tetra Tech NUS, Inc.
Lab ID: SG2820-3
Client ID: OU4-SS-M12-1S
Project: Portsmouth Naval Shipyard C
SDG: SG2820
Lab File ID: G8638.D

Sample Date: 26-APR-13
Received Date: 26-APR-13
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 09-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: 74.
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene	U	12.	ug/Kgdrywt	1	20	25.	1.5	12.
Fluorene	E	1100	ug/Kgdrywt	1	20	25.	3.9	12.
Anthracene	E	1200	ug/Kgdrywt	1	20	25.	1.5	12.
Fluoranthene	E	5000	ug/Kgdrywt	1	20	25.	2.2	12.
Pyrene	E	4000	ug/Kgdrywt	1	20	25.	2.6	12.
Benzo(a)anthracene	E	3200	ug/Kgdrywt	1	20	25.	2.3	12.
Chrysene	E	2300	ug/Kgdrywt	1	20	25.	2.1	12.
Benzo(a)pyrene	E	1500	ug/Kgdrywt	1	20	25.	4.1	12.
Dibenzo(a,h)anthracene	E	400	ug/Kgdrywt	1	20	25.	2.2	12.
2-Methylnaphthalene-D10		57.2	%					
Fluorene-D10		61.6	%					
Pyrene-D10		68.6	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tetra Tech NUS, Inc.
Lab ID: SG2820-3DL2
Client ID: OU4-SS-M12-1S
Project: Portsmouth Naval Shipyard C
SDG: SG2820
Lab File ID: G8678.D

Sample Date: 26-APR-13
Received Date: 26-APR-13
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 14-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: 74.
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene	U	1700	ug/Kgdrywt	140	20	3400	210	1700
Fluorene		4500	ug/Kgdrywt	140	20	3400	550	1700
Anthracene		6700	ug/Kgdrywt	140	20	3400	210	1700
Fluoranthene		31000	ug/Kgdrywt	140	20	3400	310	1700
Pyrene		16000	ug/Kgdrywt	140	20	3400	360	1700
Benzo(a)anthracene		5800	ug/Kgdrywt	140	20	3400	330	1700
Chrysene		6400	ug/Kgdrywt	140	20	3400	290	1700
Benzo(a)pyrene	J	1400	ug/Kgdrywt	140	20	3400	570	1700
Dibenzo(a,h)anthracene	U	1700	ug/Kgdrywt	140	20	3400	310	1700
2-Methylnaphthalene-D10	D	0.00	%					
Fluorene-D10	D	0.00	%					
Pyrene-D10	D	0.00	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Tetra Tech NUS, Inc.
Lab ID: SG2820-2
Client ID: OU4-SS-M12-2S
Project: Portsmouth Naval Shipyard C
SDG: SG2820
Lab File ID: G8637.D

Sample Date: 26-APR-13
Received Date: 26-APR-13
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 09-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: 76.
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene		130	ug/Kgdrywt	1	20	23.	1.4	11.
Fluorene	E	2100	ug/Kgdrywt	1	20	23.	3.6	11.
Anthracene	E	2400	ug/Kgdrywt	1	20	23.	1.4	11.
Fluoranthene	E	19000	ug/Kgdrywt	1	20	23.	2.0	11.
Pyrene	E	8800	ug/Kgdrywt	1	20	23.	2.4	11.
Benzo(a)anthracene	E	5100	ug/Kgdrywt	1	20	23.	2.2	11.
Chrysene	E	3600	ug/Kgdrywt	1	20	23.	1.9	11.
Benzo(a)pyrene	E	920	ug/Kgdrywt	1	20	23.	3.8	11.
Dibenzo(a,h)anthracene		210	ug/Kgdrywt	1	20	23.	2.0	11.
2-Methylnaphthalene-D10		52.2	%					
Fluorene-D10		62.5	%					
Pyrene-D10		52.2	%					

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Report of Analytical Results

Client: Tetra Tech NUS, Inc.
Lab ID: SG2820-2DL2
Client ID: OU4-SS-M12-2S
Project: Portsmouth Naval Shipyard C
SDG: SG2820
Lab File ID: G8677.D

Sample Date: 26-APR-13
Received Date: 26-APR-13
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 14-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: 76.
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene	U	1100	ug/Kgdrywt	100	20	2300	140	1100
Fluorene	J	1500	ug/Kgdrywt	100	20	2300	360	1100
Anthracene	J	2100	ug/Kgdrywt	100	20	2300	140	1100
Fluoranthene		8400	ug/Kgdrywt	100	20	2300	200	1100
Pyrene		6500	ug/Kgdrywt	100	20	2300	240	1100
Benzo(a)anthracene		3400	ug/Kgdrywt	100	20	2300	220	1100
Chrysene		3400	ug/Kgdrywt	100	20	2300	190	1100
Benzo(a)pyrene	J	2100	ug/Kgdrywt	100	20	2300	380	1100
Dibenzo(a,h)anthracene	J	230	ug/Kgdrywt	100	20	2300	200	1100
2-Methylnaphthalene-D10	D	0.00	%					
Fluorene-D10	D	0.00	%					
Pyrene-D10	D	0.00	%					

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Report of Analytical Results

Client: Tetra Tech NUS, Inc.
Lab ID: SG2820-1
Client ID: OU4-SS-M12-4S
Project: Portsmouth Naval Shipyard C
SDG: SG2820
Lab File ID: G8639.D

Sample Date: 26-APR-13
Received Date: 26-APR-13
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 09-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: 59.
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene		100	ug/Kgdrywt	1	20	26.	1.6	13.
Fluorene	E	2400	ug/Kgdrywt	1	20	26.	4.2	13.
Anthracene	E	960	ug/Kgdrywt	1	20	26.	1.6	13.
Fluoranthene	E	15000	ug/Kgdrywt	1	20	26.	2.4	13.
Pyrene	E	15000	ug/Kgdrywt	1	20	26.	2.7	13.
Benzo(a)anthracene	E	12000	ug/Kgdrywt	1	20	26.	2.5	13.
Chrysene	E	7200	ug/Kgdrywt	1	20	26.	2.2	13.
Benzo(a)pyrene	E	3400	ug/Kgdrywt	1	20	26.	4.3	13.
Dibenzo(a,h)anthracene	E	940	ug/Kgdrywt	1	20	26.	2.4	13.
2-Methylnaphthalene-D10		41.3	%					
Fluorene-D10		45.8	%					
Pyrene-D10		56.9	%					

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Report of Analytical Results

Client: Tetra Tech NUS, Inc.
Lab ID: SG2820-1DL
Client ID: OU4-SS-M12-4S
Project: Portsmouth Naval Shipyard C
SDG: SG2820
Lab File ID: G8646.D

Sample Date: 26-APR-13
Received Date: 26-APR-13
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 10-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: 59.
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene	U	1300	ug/Kgdrywt	100	20	2600	160	1300
Fluorene		3700	ug/Kgdrywt	100	20	2600	420	1300
Anthracene		6400	ug/Kgdrywt	100	20	2600	160	1300
Fluoranthene		26000	ug/Kgdrywt	100	20	2600	240	1300
Pyrene		24000	ug/Kgdrywt	100	20	2600	270	1300
Benzo(a)anthracene		10000	ug/Kgdrywt	100	20	2600	250	1300
Chrysene		11000	ug/Kgdrywt	100	20	2600	220	1300
Benzo(a)pyrene		7500	ug/Kgdrywt	100	20	2600	430	1300
Dibenzo(a,h)anthracene	J	890	ug/Kgdrywt	100	20	2600	240	1300
2-Methylnaphthalene-D10	D	0.00	%					
Fluorene-D10	D	0.00	%					
Pyrene-D10	D	0.00	%					

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INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** OU4-SS-M12-1S

Matrix: SOIL **SDG Name:** SG2820

Percent Solids: 74.6 **Lab Sample ID:** SG2820-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	3520		*	P	5	2.7	0.46	2.1

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** OU4-SS-M12-2S

Matrix: SOIL **SDG Name:** SG2820

Percent Solids: 76.4 **Lab Sample ID:** SG2820-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	723		*	P	5	2.1	0.37	1.7

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** OU4-SS-M12-4S

Matrix: SOIL **SDG Name:** SG2820

Percent Solids: 58.9 **Lab Sample ID:** SG2820-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	2190		*	P	5	2.5	0.43	2.0

Comments:

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: Vanessa Good
Tetra Tech NUS, Inc.
Foster Plaza 7
Pittsburgh,PA 15220

Lab Sample ID: SG2820-1
Report Date: 10-MAY-13
Client PO: 1045366 112G03685 N
Project: Portsmouth Naval Shi
SDG: SG2820

Sample Description	Matrix	Date Sampled	Date Received
OU4-SS-M12-4S	SL	26-APR-13	26-APR-13

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	59. %	1		N/A	SM2540G	WG123412	01-MAY-13 07:21:57	SM2540G	30-APR-13	

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: Vanessa Good
Tetra Tech NUS, Inc.
Foster Plaza 7
Pittsburgh,PA 15220

Lab Sample ID: SG2820-2
Report Date: 10-MAY-13
Client PO: 1045366 112G03685 N
Project: Portsmouth Naval Shi
SDG: SG2820

Sample Description	Matrix	Date Sampled	Date Received
OU4-SS-M12-2S	SL	26-APR-13	26-APR-13

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	76. %	1		N/A	SM2540G	WG123412	01-MAY-13 07:22:05	SM2540G	30-APR-13	

Report of Analytical Results

Client: Vanessa Good
Tetra Tech NUS, Inc.
Foster Plaza 7
Pittsburgh,PA 15220

Lab Sample ID: SG2820-3
Report Date: 10-MAY-13
Client PO: 1045366 112G03685 N
Project: Portsmouth Naval Shi
SDG: SG2820

Sample Description	Matrix	Date Sampled	Date Received
OU4-SS-M12-1S	SL	26-APR-13	26-APR-13

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	74. %	1		N/A	SM2540G	WG123412	01-MAY-13 07:22:15	SM2540G	30-APR-13	

APPENDIX C
REGION I WORKSHEETS

EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Portsmouth
Reference No. _____

REGION I ORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name Katahdin
Case/Project No. _____
SDG No. SG2820
No. of Samples/Matrix 3 Soil

SOW/Method No. _____
Sampling Date(s) _____
Shipping Date(s) _____
Date Rec'd by lab _____

Traffic Report Sample Nos. See validation Report

Trip Blank No. _____
Equipment Blank No. _____
Bottle Blank No. _____
Field Duplicate Nos. _____

PES Nos. _____

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision _____ was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page: (attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc. that received partial Tier III validation

_____

The data were evaluated based upon the following parameters:

- Overall Evaluation of Data
- Data Completeness (CSF Audit - Tier I)
- Preservation & Technical Holding Times
- GC/MS & GC/ECD Instrument Performance Check
- Initial & Continuing Calibrations
- Blanks
- Surrogate Compounds
- Internal Standards
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicates
- Sensitivity Check
- PE Samples/Accuracy Check
- Target Compound Identification
- Compound Quantitation and Reported Quantitation Limits
- TICs
- Semivolatile and Pesticide/PCB Cleanup
- System Performance

Region I Definitions and Qualifiers:

A - Acceptable Data
J - Numerical value associated with compound is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Compound not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
TB, BB, EB - Compound detected in aqueous trip blank, aqueous bottle blank, or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Kim Solomon Company Name Tetratech Phone Number 412-921-7113

Date Validation Started 5/15/2013 Date Validation Completed 5/15/2013

EPA-NE
Data Validation Worksheet Cover Page - Page 2

See validation report

Check if all criteria are met and no hard copy worksheet provided. Indicate NA if worksheet is not applicable to analytical method. Note: there is no standard worksheet for System Performance, however, the validator must document all system performance issues in the Data Validation Memorandum.

VOA/SV worksheets:

VOA/SV-Pest/PCB	COMPLETE SDG FILE (CSF) AUDIT	_____
VOA/SV-Pest/PCB-I	PRESERVATION AND HOLDING TIMES	_____
VOA/SV-II	GC/MS INSTRUMENT PERFORMANCE CHECK (TUNING)	_____
VOA/SV-III	INITIAL CALIBRATION	_____
VOA/SV-IV	CONTINUING CALIBRATION	_____
VOA/SV-Pest/PCB-V-A	BLANK ANALYSIS	_____
VOA/SV-Pest/PCB-V-B	BLANK ANALYSIS	_____
VOA-VI	VOA SURROGATE SPIKE RECOVERIES	_____
SV-VI	SV SURROGATE SPIKE RECOVERIES	_____
VOA/SV-VII	INTERNAL STANDARD PERFORMANCE	_____
VOA/SV-Pest/PCB-VIII	MATRIX SPIKE/MATRIX SPIKE DUPLICATE	_____
VOA/SV-Pest/PCB-IX	FIELD DUPLICATE PRECISION	_____
VOA/SV-Pest/PCB-X	SENSITIVITY CHECK	_____
VOA/SV-Pest/PCB-XI	ACCURACY CHECK	_____
VOA/SV-Pest/PCB-XII	TARGET COMPOUND IDENTIFICATION	_____
VOA/SV-Pest/PCB-XIII	SAMPLE QUANTITATION	_____
VOA/SV-XIV	TENTATIVELY IDENTIFIED COMPOUNDS	_____
VOA/SV-XV	SEMIVOLATILE CLEANUP	_____
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	_____

Pest/PCB worksheets:

VOA/SV-Pest/PCB	COMPLETE SDG FILE (CSF) AUDIT	_____
VOA/SV-Pest/PCB-I	PRESERVATION AND HOLDING TIMES	_____
Pest/PCB-IIA	GC/ECD INSTRUMENT PERFORMANCE CHECK-RESOLUTION	_____
Pest/PCB-IIB	GC/ECD INSTRUMENT PERFORMANCE CHECK-RETENTION TIMES	_____
Pest/PCB-IIC	GC/ECD INSTRUMENT PERFORMANCE CHECK-ACCURACY CHECK OF INITIAL CALIBRATION	_____
Pest/PCB-IID	GC/ECD INSTRUMENT PERFORMANCE CHECK-PESTICIDE DEGRADATION	_____
Pest/PCB-III	INITIAL CALIBRATION	_____
Pest/PCB-IV	CONTINUING CALIBRATION	_____
VOA/SV-Pest/PCB-V-A	BLANK ANALYSIS	_____
VOA/SV-Pest/PCB-V-B	BLANK ANALYSIS	_____
Pest/PCB-VI	SURROGATE COMPOUNDS: SPIKE RECOVERIES AND RETENTION TIME SHIFT	_____
Pest/PCB-VII	PESTICIDE CLEANUP	_____
VOA/SV-Pest/PCB-VIII	MATRIX SPIKE/MATRIX SPIKE DUPLICATE	_____
VOA/SV-Pest/PCB-IX	FIELD DUPLICATE PRECISION	_____
VOA/SV-Pest/PCB-X	SENSITIVITY CHECK	_____
VOA/SV-Pest/PCB-XI	ACCURACY CHECK	_____
Pest/PCB-XII	COMPOUND IDENTIFICATION	_____
VOA/SV-Pest/PCB-XIII	SAMPLE QUANTITATION	_____
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	_____

I certify that all criteria were met for the worksheets checked above.

Signature: Terri Solomon Name: Terri Solomon

Date: 5/15/2013

The data validator generates a Data Validation Report, applicable to Data Validation Tiers II and III, that consists of the following components in the order specified below: (Refer to Section 11 for a description of each of the Data Validation Report components).

1. Organic Regional Data Assessment/Inorganic Regional Data Assessment (ORDA/IRDA) Form
2. Data Validation Memorandum
   a. Narrative
   b. Table I-Qualifier Recommendation Summary Table
   c. Table II-Overall Evaluation of Data
   d. Table III-Tentatively Identified Compounds
   e. Data Summary Tables
3. Standard Data Validation Worksheets
   a. Manual
   b. Automated Data Review Reports (i.e., CADRE)
4. Support Documentation
   a. Copy of non-CLP analytical method, e.g., DAS methods, modified EPA methods
   b. Copies of PES Score Reports/Vendor PES QC Acceptance Limits
   c. Copies of Telephone Logs/Communication Forms for:
      - RSCC communications
      - Requests for laboratory data resubmissions/clarifications
      - Communications with samplers resolving sampling problems
      - Communications with TPO/Lead Chemist to report contractually-deficient data for rejection/reduced payment
      - Communications with EPA Site Manager concerning possible data rejection
      - EPA Site Manager authorization for alternate DV tier
   d. Copies of data supporting recommendations for reduced payment resulting from CSF Audit and/or PE sample result evaluation
   e. Original data to support recommendations for data rejection/non-payment identified from Tier II or Tier III data validation
   f. Copies of field sampling notes and/or field report supplied by field sampler
   g. Copies of EPA-approved amendments to QAPjP and/or SAP describing modified criteria to be used for validating site data
5. CSF Completeness Evidence Audit
6. DQO Summary Form

The data validator is responsible for implementing all corrective actions required by the contractor Lead Chemist in response to EPA-NE data validation oversight findings.

EPA-NE - Data Validation Worksheet
Overall Evaluation of Data - Data Validation Memorandum - Table II

NA

VOLATILE ORGANICS					
DQO (list all DQOs)	Sampling and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Validator: Agnes Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
Overall Evaluation of Data - Data Validation Memorandum - Table II

See validation report

SEMIVOLATILE ORGANICS					
DQO (list all DQOs)	Sampling and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		

* The evaluation of "sampling error" cannot be completely assessed in data validation.

** Sampling variability is not assessed in data validation.

Validator: Alan Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB

COMPLETE SDG FILE (CSF) AUDIT NA

Organic Fractions: _____

Missing Information	Date Lab Contacted	Date Received

Validator: Matthew Salomon Date: 5/15/2013

EPA-NE - Data Validation
VOA/SV - Pest/PCB-I

see validation report

12/96

Sampler:_____ Company:_____ Contacted: Yes No Date:_____

I. PRESERVATION AND HOLDING TIMES - Circle sample numbers with exceeded technical holding times or omitted preservation.
List all required preservation codes and circle omitted preservation codes.
Circle all exceeded technical holding times.
Identify extraction technique after "# of Days"/(*Extraction Code).

Sample No (TR No.)	Matrix	Pres. Code	Date Sampled	VOA			BNA					PEST/PCB				
				Date Analyzed	# of Days from Samp. to Anal.	Action	Date Extracted	# of Days from Samp. to Extr./(*)	Date Analyzed	# of Days from Extr. to Anal.	Action	Date Extracted	# of Days from Samp. to Extr./(*)	Date Analyzed	# of Days from Extr. to Anal	Action

Preservation Code:
1. Cool @ 4°C (± 2°)
2. Preserve with HCl to at least pH 2
3. Protect from light
4. Freeze
5. Room Temperature (Avoid excessive heat)

(*Extraction Code:)
L/L - Liquid/Liquid
SON - Sonication
SEP - Separatory Funnel
SOX - Soxhlet
SPE - Solid Phase Extraction

Action Code:
J - Estimate (J) Detected Values
UJ - Estimate (UJ) Non-Detected Values
R - Reject (R) Non-Detected Values

Validator: Steve Solomon

Date: 5/15/2013

see validation report

II. GC/MS INSTRUMENT PERFORMANCE CHECK (TUNING)

List all Instrument Performance Checks that are outside method QC tuning acceptance criteria.

Volatile Instrument Performance Check (Compound Name)	Analysis Date and Time	Instrument	Ion(s) Affected	Percent Relative Abundance	QC Limits	Samples Affected	Action
Comments:							

Semivolatile Instrument Performance Check (Compound Name)	Analysis Date and Time	Instrument	Ion(s) Affected	Percent Relative Abundance	QC Limits	Samples Affected	Action
Comments:							

If tuning compounds and criteria are different from those specified in CLP SOW OLM03.1, then the validator should include a copy of the method-specific tuning criteria with this worksheet.

Validator: Lisa Sulcman

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV-III

see validation report

III. INITIAL CALIBRATION - List all analytes that are outside calibration criteria.

Date of ICAL	Instrument	Parameter	Matrix	Compound	% RSD	$\overline{RRF}$	Samples Affected	Action

Comments:

Validator: Kim Soloman

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV-IV

See validation report

IV. CONTINUING CALIBRATION - List all analytes that are outside calibration criteria.

Date of ICAL	Date of CCAL	Instrument	Parameter	Matrix	Compound	%D	RRF	Samples Affected	Action

Comments:

Validator: Kim Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet

VOA/SV - Pest/PCB-V-A

See validation report

V. BLANK ANALYSIS

List the blank contamination below. Concentration Level:_____

Sampler: _____ Company: _____ Contacted: Yes No Date:_____

1. Laboratory: Method, Storage and Instrument Blanks

Date Extracted	Date Analyzed	Parameter/ Matrix	Sample No. (Blank Type)	Instrument/ Column	Compound	Conc. (units)

2. Field: Equipment (Rinsate), Trip and Bottle Blanks

Date Extracted	Date Analyzed	Parameter/ Matrix	Sample No. (Blank Type)	Instrument/ Column	Compound	Conc. (units)

Validator: Kim Salomon Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-V-B

see validation report

3. Blank Actions - List the maximum concentrations of blank compounds.

Compound	Type of Blank	Date Blank Sampled/Originated	Max. Conc. (units)	Action Level (units)	Sample QL	Samples Affected	Action

Comments: _____

Validator: Kim Sofsmon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA-VI

~~See Validation Report~~ NA

VI. VOA SURROGATE SPIKE RECOVERIES - List all surrogate compound recoveries that are outside method QC acceptance criteria.

Method	Volatile Method QC Acceptance Criteria				
	Toluene-d_8	BFB	DCE-d_4	Other:	
OLM03.2	Water 88-110 Soil 84-138	Water 86-115 Soil 59-113	Water 76-114 Soil 70-121		
OLC02.1	NA	80-120	NA		
Other:					
Sample Number/Matrix	**% Recovery**	**% Recovery**	**% Recovery**	**% Recovery**	**Action**

Validator: Kim Selmon

Date: 5/13/2013

See validation report

VI. SV SURROGATE SPIKE RECOVERIES - List all surrogate compound recoveries that are outside method QC acceptance criteria.

Method	Base/Neutral Method QC Acceptance Criteria					
	NBZ-d_5	2-FBP	TPH-d_{14}	1,2-DCB-d_4*	Other:	
OLM03.2	Water Soil 35-114 23-120	Water Soil 43-116 30-115	Water Soil 33-141 18-137	Water Soil 16-110 20-130		
OLC02.1	40-110	30-110	20-140	NA		
Other:						
Sample Number/Matrix	**% Recovery**	**% Recovery**	**% Recovery**	**% Recovery**	**% Recovery**	**Action**

Method	Acid Method QC Acceptance Criteria					
	Phenol-d_5	2-FP	2,4,6-TBP	2-CP-d_4*	Other:	
OLM03.2	Water Soil 10-110 24-113	Water Soil 21-110 25-121	Water Soil 10-123 19-122	Water Soil 33-110 20-130		
OLC02.1	15-115	15-110	15-130	NA		
Other:						
Sample Number/Matrix	**% Recovery**	**% Recovery**	**% Recovery**	**% Recovery**	**% Recovery**	**Action**

* Advisory Surrogates - OLM03.2

Validator: Tim Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV-VII

see validation report

VII. INTERNAL STANDARD PERFORMANCE

List the internal standards that are outside the area count and retention time method QC acceptance criteria.
IS Area Count method QC acceptance criteria: _____
IS Retention Time method QC acceptance criteria: _____

Sample Number (TR#)	Date and Time Analyzed	Instrument	Parameter	IS Outside Area Count and/or RT Criteria	__IS Area	RT Shift	Acceptable Range (IS area or RT shift)	Action

Validator: Kim Sikorski

Date: 5/15/2013

NA

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-VIII

VIII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - List all MS/MSD analytes that are outside method QC acceptance criteria.

Use a separate worksheet for each MS/MSD pair.

Sample # _____ Matrix _____ Concentration Level _____

Parameter	Compound	MS %Rec	MSD %Rec	RPD	Method QC Limits		Concentration			% RSD	Action
					% Rec	RPD	Unspiked Sample	MS	MSD		

Validator: Tim Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-IX

NA

IX. FIELD DUPLICATE PRECISION - List all field duplicate analytes that are outside criteria.

Use a separate worksheet for each field duplicate pair.

Sample Number _____ Duplicate Sample Number _____ Matrix _____

Parameter	Compound	Sample Conc.	Sample QL		Duplicate Conc.	Duplicate QL		RPD	QC Acceptance Criteria RPD or NA*	Action
			SQL	2xSQL		SQL	2xSQL			

* For instances where one duplicate result is ND (or reported less than the sample QL).

Does the MS/MSD data indicate acceptable laboratory precision? Y N

Comments: _____

_____

Sampler Name: _____ Contractor Name: _____ Date Contacted: _____

Reason for Contact and resolution obtained: _____

Validator: Steve Solomon Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-X

See validation report

X. SENSITIVITY CHECK (Method Detection Limit Study)

List all compounds, surrogates, and internal standards that are outside the MDL criteria.

- Has an appropriate MDL study been submitted with seven replicates for each compound and matrix of interest? Y N
- Date of Preparation/Analysis: _____ Within 1 year? Y N
- Instrument I.D.: _____ Same as samples? Y N
- Column I.D.: _____ Same as samples? Y N

Matrix	Compound	MDL > QL	Method QC Limits < 80% or > 120%	IS Outside Area Count and/or RT Criteria	RSD > 20%	Samples Affected	Action

If an MDL study has not been submitted, use only the LFB results to evaluate data.

(Laboratory Fortified Blank) - List all LFB compounds, surrogates and internal standards that are outside criteria.

- Has an appropriate and complete LFB been submitted at the proper frequency? Y N
- Does it contain all target compounds at the method-required QLs? Y N
- Was the LFB spiked with a standard from a source (vendor) independent of the calibration standard? Y N

Matrix	Compound	Method QC Limits < 60% or > 140% Other:	IS Outside Area Count and/or RT Criteria	Samples Affected	Action

Validator: Kim Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-XI

NA

XI. ACCURACY CHECK (Performance Evaluation Results) - List all analytes that are outside criteria.

SDG No: _____ CASE: _____

Are more than one-half of the PES analytes within criteria for each parameter. Y N

PE Sample Number	Ampule Number	Parameter	Type of PES	Matrix	Analyte	Conc.	Region I EPA PES Scores*	Non-EPA PES Scores**	Samples Affected	Action

* For Region I PESs indicate the Region I PES Score Report Result: Action High; Action Low; TCL MISS; TCL CONTAMINANT; TIC HIT; TIC MISS; TIC CONTAMINANT

** For Non-EPA PESs indicate the Non-EPA PES Score: PES COMPOUND MISS; PES COMPOUND CONTAMINANT; PES COMPOUND HIT (% Recovery Limits)

Validator: Helen Solomon Date: 5/15/2013

~~N/A~~ see validation report

XII. TARGET COMPOUND IDENTIFICATION - List the analytes that are outside the acceptance criteria.

Sample Number	Compound	___MS Ions	____RRT	Action

Validator: Tara Solomon

Date: 5/15/2013

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-XIII

See validation report

XIII. SAMPLE QUANTITATION

Recalculate, from the raw data, the concentrations for one positive detect and one reported sample quantitation limit for a non-detect in a diluted sample or soil sample per fraction. (Note: Although Section XIII, C.1.a, requires that one calculation for each fraction in each sample be performed, the validator is only required to reproduce an example, for each fraction, of one positive detect and one sample quantitation limit calculation on this worksheet.)

Do all soil/sediment samples have % solids greater than 30%? Y N
If no, list sample numbers_____

Fraction		Calculation
VOA		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		
BNA		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		
Pesticide/PCB		
Sample No.:		
Reported Compound:		
Reported Value:		
Not Detected Compound:		
Reported Quantitation Limit:		

Validator:_____ Date:_____

NA

XIV. TENTATIVELY IDENTIFIED COMPOUNDS (TICs)

List the 5 TICs having the highest concentration for each sample parameter.

Sample Number	Parameter	Compound	RRT	Est. Conc.	Action

Validator: Drew Salomon

Date: 5/13/2013

EPA-NE - Data Validation Worksheet
VOA/SV-XV

NA

XV. SEMIVOLATILE CLEANUP - List all analytes that are outside method cleanup QC criteria.

Cleanup Procedure	Instrument # or Lot #	Date/Time GPC Calibrated or Check Solution Analyzed	Compound	% Rec	QC Limits	Samples Affected	Action

Did the GPC column meet; resolution requirements? Y or N
peak shape requirements? Y or N
retention time shift requirements? Y or N

Was the GPC calibration, Silica Gel cleanup checked at the method required frequency with correct compounds and concentrations? Y or N

Were all compounds less than QL for the GPC/Silica Gel/Acid-Partition blank? Y or N

Did the blank surrogate recoveries and IS area counts and RTs (if added) meet method QC acceptance criteria? Y or N

Comments: _____

Validator: Hans Solomon

Date: 5/13/2013

EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Portsmouth
Reference No. _____

REGION I INORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name Katahdin
Case/Project No. _____
SDG No. _____
No. of Samples/Matrix _____

SOW/Method No. _____
Sampling Date(s) _____
Shipping Date(s) _____
Date Rec'd by lab _____

Traffic Report Sample Nos. See Validation Report

Equipment Blank No. _____
Bottle Blank No. _____
Field Duplicate Nos. _____
PES Nos. _____

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision _____ was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page: (attach modified criteria from EPA approved QAPP or amendment to QAPP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc., that received partial Tier III validation.

The data were evaluated based upon the following parameters:

- Overall Evaluation of Data
- Data Completeness (CSF Audit - Tier I)
- Preservation and Technical Holding Times
- ICP-MS Tune
- Calibrations
- Blanks
- ICP-AES Interference Check Sample (ICS)
- ICP-MS Interference Check Sample (ICS)
- ICP-MS Internal Standards
- Matrix Spikes
- Laboratory Duplicate Samples
- Field Duplicates
- ICP Serial Dilutions
- Sensitivity Check
- Performance Evaluation Samples/Accuracy Check
- Analyte Quantitation and Reported Quantitation Limits
- System Performance

Region I Definitions and Qualifiers:

A - Acceptable Data
J - Numerical value associated with analyte is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Analyte not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
BB, EB - Analyte detected in aqueous bottle blank or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Terri Solomon Company Name TEMA Tech Phone Number _____

Date Validation Started _____ Date Validation Completed 5/15/13

Check if all criteria are met and no hard copy worksheet is provided. Indicate NA if worksheet is not applicable to the analytical method. Note: there is no standard worksheet for System Performance; however, the validator must document all system performance issues in the Data Validation Memorandum.

INORG Worksheets:

INORG	COMPLETE SDG FILE (CSF) AUDIT	_____
INORG-I	PRESERVATION AND TECHNICAL HOLDING TIMES	_____
INORG-II	ICP-MS TUNE	_____
INORG-III-A/B	CALIBRATIONS	_____
INORG-IV-A/B	BLANKS	_____
INORG-IV-C.1	BLANKS	_____
INORG-IV-C.2	BLANKS	_____
INORG-V-A	ICP-AES INTERFERENCE CHECK SAMPLE - ICSAB	_____
INORG-V-B.1	ICP-AES INTERFERENCE CHECK SAMPLE - ICSA	_____
INORG-V-B.2	ICP-AES INTERFERENCE CHECK SAMPLE - ICSA	_____
INORG-VI-A	ICP-MS INTERFERENCE CHECK SAMPLE - ICSAB	_____
INORG-VI-B	ICP-MS INTERFERENCE CHECK SAMPLE - ICSA	_____
INORG-VII	ICP-MS INTERNAL STANDARDS	_____
INORG-VIII	MATRIX SPIKES	_____
INORG-IX	LABORATORY DUPLICATE SAMPLES	_____
INORG-X	FIELD DUPLICATES	_____
INORG-XI	ICP SERIAL DILUTIONS	_____
INORG-XII-A/B	SENSITIVITY CHECK	_____
INORG-XIII-A	PE SAMPLES/ACCURACY CHECK- LCS	_____
INORG-XIII-B	PE SAMPLES/ACCURACY CHECK- PE RESULTS	_____
INORG-XIV	ANALYTE QUANTITATION AND REPORTED QUANTITATION LIMITS	_____
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	_____

I certify that all criteria were met for the worksheets checked above.

Signature: _____ Name: _____

Date: _____

The data validator generates a Data Validation Report, applicable to Data Validation Tiers II and III, that consists of the following components in the order specified below: (Refer to Part I - Data Validation Manual, Section 11 for a description of each of the Data Validation Report components).

1. Organic Regional Data Assessment/Inorganic Regional Data Assessment (ORDA/IRDA) Form
2. Data Validation Memorandum
   a. Narrative
   b. Table I-Qualifier Recommendation Summary Table
   c. Table II-Overall Evaluation of Data
   d. Data Summary Tables
3. Standard Data Validation Worksheets
   a. Manual
   b. Automated Data Review Reports
4. Support Documentation
   a. Copy of non-CLP analytical method, e.g., DAS methods, modified EPA methods
   b. Copies of PES Score Reports/Vendor PES QC Acceptance Limits
   c. Copies of Telephone Logs/Communication Forms for:
      - RSCC communications
      - Requests for laboratory data resubmissions/clarifications
      - Communications with samplers resolving sampling problems
      - Communications with PO/DV Chemist/Lead Chemist to report contractually-deficient data for rejection/reduced payment
      - Communications with EPA Site Manager concerning possible data rejection
      - EPA Site Manager authorization for alternate DV tier
   d. Copies of data supporting recommendations for reduced payment resulting from CSF Audit and/or PE sample result evaluation
   e. Original data to support recommendations for data rejection/non-payment identified from Tier II or Tier III data validation
   f. Copies of field sampling notes and/or field report supplied by field sampler
   g. Copies of EPA-approved amendments to QAPP and/or SAP describing modified criteria to be used for validating site data
5. CSF Completeness Evidence Audit
6. DQO Summary Form

The data validator is responsible for implementing all corrective actions required by the contractor Lead Chemist in response to EPA-NE data validation oversight findings.

EPA-NE - Data Validation Worksheet
Overall Evaluation of Data - Data Validation Memorandum - Table II NA

Site:_____ Case:_____ SDG:_____

INORGANICS					
DQO (List all DQOs)	Sampling and/or Analytical Method Appropriate? (Yes or No)	Measurement Error		Sampling Variability**	Potential Usability Issues
		Analytical Error	Sampling Error*		

* The evaluation of "sampling error" cannot be completely assessed in data validation.
** Sampling variability is not assessed in data validation.

Validator:_____ Date:_____

EPA-NE - Data Validation Worksheet
INORG

COMPLETE SDG FILE (CSF) AUDIT

Inorganic Parameters:_____

Missing Information	Date Lab Contacted	Date Received

Validator: _____ Date: _____

EPA-NE - Data Validation Worksheet
INORG-I

I. PRESERVATION AND HOLDING TIMES

Circle sample numbers with exceeded technical holding times or omitted preservation.
Circle all exceeded technical holding times.

MeT HT

Sample No.	Matrix	Pres. Code		Date Sampled	Metals		Hg		CN		Action
		Metals	CN		Date Analyzed	# of Days from Samp. to Analysis	Date Analyzed	# of Days from Samp. to Analysis	Date Analyzed	# of Days from Samp. to Analysis	

Preservation Code:
1. Cool (≤ 6°C)
2. pH < 2 with HNO_3
3. pH > 12 with NaOH
4. Room Temperature
5. Freeze
6. Reducing agent (for oxidants)
7. Treated for sulfides
8. Other - _____

Action Code:
J - Estimate (J) Detected Values
UJ - Estimate (UJ) Non-Detected Values
R - Reject (R) Non-Detected Values

Sampler:_____ Company:_____ Contacted: Y N Date:_____

Validator:_____ Date:_____

EPA-NE - Data Validation Worksheet
INORG-II

II. ICP-MS TUNE

List all Tunes that are outside method QC acceptance criteria.

Method:_____

Method QC acceptance criteria for mass calibration:_____ OK

Method QC acceptance criteria for resolution check/peak width:_____ at_____% peak height.

Method QC acceptance criteria for % RSD:_____

Analysis Date and Time	Analyte	Mass Calibration			Mass Resolution		% RSD of Absolute Signals	Analyte/Samples Affected	Action
		True Mass (amu)	Measured Mass (amu)	Absolute Difference of Masses (amu)	Peak Width (amu)	% Peak Height			
Comments:									

Validator:_____ Date:_____

DRAFT 11/08

EPA-NE - Data Validation Worksheet
INORG-III-A/B/C

III. CALIBRATIONS

All OK

A. Instrument Calibration - List all calibration correlation coefficients that are outside the method QC acceptance criteria.
Calibration correlation QC acceptance criteria: _____ Calibration Type: _____

Date/Time	Instr.	Analyte	Corr. Coef.	Samples Affected	Action

B. Initial and Continuing Calibration Verifications - List all ICV and CCV analyte recoveries that are outside the method QC acceptance criteria.
ICV method QC acceptance criteria: _____ CCV method QC acceptance criteria: _____

Date	Instr.	Analyte	ICV/CCV #	% R	Samples Affected	Action

C. Quantitation Limit Check Standard - List all QL Check Standard analytes that are outside method QC acceptance criteria.
QL Check Standard method QC acceptance criteria: _____

Date	Instr.	Analyte	QL Check Std. #	% R	Affected Range	Samples Affected	Action

Comments: _____

_____

Validator: _____ Date: _____

EPA-NE - Data Validation Worksheet
INORG-IV-A/B

IV. BLANKS - List the blank contamination and negative blank results below. SEE VALIDATION REPORT

Sampler: _____ Company: _____ Contacted: Y N Date: _____

A. Laboratory: Preparation (Method) and Calibration (Instrument) Blanks

Date Prepared	Date Analyzed	Blank Type (ICB/CCB#/Prep Blank)	Matrix	Instrument	Analyte	Conc. (units)

B. Field: Equipment (Rinsate) and Bottle Blanks

Date Sampled	Date Analyzed	Sample No. (Blank Type)	Matrix	Instrument	Analyte	Conc. (units)

Were the proper number of blanks analyzed at the proper frequency? Y N

For ICP MS - Are internal standard responses in all blanks within method QC acceptance criteria? Y N

Comments: _____

_____

Validator: _____ Date: _____

EPA-NE - Data Validation Worksheet
INORG-IV-C.1
IV. BLANKS

C.1 Blank Contamination Worksheet

Circle the highest concentration of each contaminant.

SEE VALIDATION REPORT

Analyte	Date Analyzed	ICB	CCB							PBW	PBS	EB	BB	Max. Conc.	Action Level
			1	2	3	4	5	6	7						
Aluminum															
Antimony															
Arsenic															
Barium															
Beryllium															
Cadmium															
Calcium															
Chromium															
Cobalt															
Copper															
Iron															
Lead															
Magnesium															
Manganese															
Mercury															
Nickel															
Potassium															
Selenium															
Silver															
Sodium															
Thallium															
Vanadium															
Zinc															
Cyanide															

Validator: _____ Date: _____

EPA-NE - Data Validation Worksheet
INORG-IV-C.2

IV. BLANKS

C.2 Blank Actions - List the maximum concentrations of each analyte among all blanks associated with each sample.

Analyte	Type of Blank	Date Blank Originated	Max. Conc. (units)	Blank Action Level (units)	Sample QL	Samples Affected	Action
Comments:							

Validator: _____ Date: _____

EPA NE - Data Validation Worksheet
INORG-V-A

V. A. ICP-AES INTERFERENCE CHECK SAMPLE - ICSAB

1. List all analytes in the ICSAB that are outside ICSAB percent recovery criteria.

OK

Date	Analyte	%R	Conc. of Interferents Observed in ICSAB (ug/L)				Samples Affected	Action
			Al	Ca	Fe	Mg		
Comments:								

Validator:_____ Date:_____

DRAFT 11/08

EPA NE - Data Validation Worksheet
INORG-V-B.1

V. B.1 ICP-AES INTERFERENCE CHECK SAMPLE - ICSA

1. List all analytes in the ICSA that are outside ICSA criteria. OK

Date	Analyte	MDL (ug/L)	ICSA Observed Conc. (ug/L)	ICSA True Value (ug/L)	Criteria: 80-120% R or TV±2xMDL	Conc. of Interferents Observed in ICSA (ug/L)				Associated Samples
						Al	Ca	Fe	Mg	
Comments:										

Validator:_____ Date:_____

EPA NE - Data Validation Worksheet
INORG-V-B.2

V. B.2 ICP-AES INTERFERENCE CHECK SAMPLE - ICSA

2. List all affected sample results. OK

Affected Sample	Interferent	Conc. in Sample (ug/L)	Analyte	Conc. in Sample (ug/L)	Estimated Interference in Sample (ug/L)	Action
Comments:						

Validator:_____ Date:_____

EPA NE - Data Validation Worksheet
INORG-VI-A

VI. A. ICP-MS INTERFERENCE CHECK SAMPLE - ICSAB

QK NA

List all analytes that are outside ICSAB criteria of 80-120% R.

Date	Analyte	%R	Samples Affected	Action

Comments:

Validator:_____ Date:_____

EPA NE - Data Validation Worksheet
INORG-VI-B

VI. B. ICP-MS INTERFERENCE CHECK SAMPLE - ICSA

NA

List all analytes that are outside ICSA criteria.

Date	Analyte	MDL (ug/L)	ICSA Observed Conc. (ug/L)	ICSA True Value (ug/L)	Criteria: 80-120% R or TV ± 2xMDL	Samples Affected	Action
Comments:							

Validator:_____ Date:_____

DRAFT 11/08

EPA-NE - Data Validation Worksheet
INORG-VII

VII. ICP-MS INTERNAL STANDARDS

List all internal standards that are outside method QC acceptance criteria. NA

IS method QC acceptance criteria: _____

Sample Number	Date and Time Analyzed	IS, amu	% RI	Analytes Affected (amu)	Action
Comments:					

Validator:_____ Date:_____

DRAFT 11/08

EPA-NE - Data Validation Worksheet
INORG-VIII

VIII. MATRIX SPIKES - List all matrix spike analytes that are outside method QC acceptance criteria.

Use a separate worksheet for each matrix spike sample.

Sample No.: _____ Matrix: _____ OK

Method	Analyte	Spiked Sample Result	Sample Result	Amount of Spike Added	MS % Recovery	Method QC Limits % Recovery	Post-Digest Spike % Recovery	Action
Comments:								

Validator:_____ Date:_____

EPA-NE - Data Validation Worksheet
INORG-IX

IX. LABORATORY DUPLICATE SAMPLES - List all analytes that are outside method QC acceptance criteria for the specific matrix.

Use a separate worksheet for each laboratory duplicate sample. See Validation Report

Sample No.:_____ Duplicate Sample No.:_____ Matrix:_____

Laboratory duplicate sample method QC acceptance criteria:_____

Method	Analyte	Sample Conc.	Sample		Duplicate Conc.	Duplicate		RPD or Abs. Diff.	QC Acceptance Criteria (RPD or Abs. Diff.)	Action
			SQL	5xSQL		SQL	5xSQL			

Do the field duplicate sample data indicate acceptable field precision? Y N

Comments:_____

_____

_____

Validator:_____ Date:_____

DRAFT 11/08

EPA-NE - Data Validation Worksheet
INORG-X

X. FIELD DUPLICATES - List all field duplicate analytes that are outside criteria.

Use a separate worksheet for each field duplicate pair. NA

Sample No.:_____ Duplicate Sample No.:_____ Matrix:_____

Method	Analyte	Sample Conc.	Sample		Duplicate Conc.	Duplicate		RPD or Abs. Diff.	QC Acceptance Criteria (RPD or Abs. Diff.)	Action
			SQL	5xSQL		SQL	5xSQL			

Do the laboratory duplicate sample data indicate acceptable laboratory precision? Y N

Comments: _____

_____

Sampler Name: _____ Contractor Name: _____ Date Contacted: _____

Reason for contact and resolution obtained: _____

Validator: _____ Date: _____

EPA-NE - Data Validation Worksheet
INORG-XI

XI. ICP SERIAL DILUTIONS

Use a separate worksheet for each serial dilution sample. OK

Sample No.:_____ Matrix:_____ Method:_____

List all serial dilution analytes that are outside method QC acceptance criteria.

% Difference method QC acceptance criteria: _____
Minimum concentration required to apply the % D criteria (e.g., 50x MDL): _____

Analyte	MDL	Min. Conc. Required	Sample Result	Serial Dilution Sample Result (corrected for dilution)	% D	Action
Comments:						

Validator:_____ Date:_____

XII. SENSITIVITY CHECK

OK

A. Method Detection Limit Study - List all analytes that are outside the MDL criteria.

- Has an appropriate MDL study been submitted with seven replicates for each analyte and matrix of interest? **Y N**
- Were samples analyzed within one year of the MDL study and on the same instrument? **Y N**

Matrix	Analyte	MDL	MDL > QL	Samples Affected	Action

If an MDL study has not been submitted, use only the LFB results to evaluate data.

B. Laboratory Fortified Blank - List all LFB analytes that are outside the LFB criteria.

- Has an appropriate and complete LFB been submitted at the proper frequency? **Y N**
- Does the LFB contain all target analytes at their QLs? **Y N**

Matrix	Method	Analyte	% R	Method QC Limits % R	Samples Affected	Action

Comments:_____

_____

Validator:_____ Date:_____

EPA-NE - Data Validation Worksheet
INORG-XIII-A

XIII. PERFORMANCE EVALUATION SAMPLES/ACCURACY CHECK

OK

A. Laboratory Control Samples - List all analytes that are outside criteria.

SDG No.:_____ Case:_____

Are more than one-half of the LCS analytes within criteria for each parameter and method? **Y** **N**

Date Prepared	Date Analyzed	Parameter/ Method	Matrix	Analyte	% Recovery (or Observed Conc.)	Method QC Acceptance Criteria	Samples Affected	Action

Comments:

Validator:_____ Date:_____

EPA-NE - Data Validation Worksheet
INORG-XIII-B

XIII. PERFORMANCE EVALUATION SAMPLES/ACCURACY CHECK

B. Performance Evaluation Results - List all analytes that are outside criteria. NA

SDG No.:_____ Case:_____

Indicate the source of the PES: Region 1 EPA PES Non-EPA PES

Are more than one-half of the PES analytes within criteria for each parameter and method? Y N

PE Sample Number	Ampule Number	Parameter/ Method	Type of PES	Matrix	Analyte	Conc.	PES Score*	Samples Affected	Action

* For Region I PESs indicate the Region I PES Score Report Result: Action High, Action Low, Analyte Missed, Contaminant.
For Non-EPA PESs indicate the Non-EPA PES Score: PES Analyte Missed; PES Analyte Contaminant; PES Analyte Hit (% Recovery Limits).

Comments:_____

_____

Validator:_____ Date:_____

EPA-NE - Data Validation Worksheet
INORG-XIV

XIV. ANALYTE QUANTITATION AND REPORTED QUANTITATION LIMITS

OK

Recalculate, from the raw data, the concentrations for one positive detect and one reported sample quantitation limit for a non-detect in a diluted sample or soil sample per analytical method. (Note: Although Section XIV, C.2.a, requires that one calculation for each method in each sample be performed, the validator is only required to reproduce an example, for each method, of one positive detect and one sample quantitation limit calculation on this worksheet.)

Do all soil/sediment samples have % solids greater than 30%? **Y** **N**

- If no, were any steps employed to address the high moisture content? _____
- Indicate the action and list the affected sample nos.: _____

Method		Calculation
ICP-AES		
Sample No.:		
Reported Analyte:		
Reported Value:		
Non-Detected Analyte:		
Reported Quantitation Limit:		
ICP-MS		
Sample No.:		
Reported Analyte:		
Reported Value:		
Non-Detected Analyte:		
Reported Quantitation Limit:		
Mercury		
Sample No.:		
Reported Value:		
Sample No.:		
Reported Quantitation Limit:		
Cyanide		
Sample No.:		
Reported Value:		
Sample No.:		
Reported Quantitation Limit:		

Validator: _____ Date: _____

APPENDIX D
SUPPORT DOCUMENTATION

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
TETRA TECH NUS, INC.
PORTSMOUTH NAVAL SHIPYARD CTO WE37
SG2820

Sample Receipt

The following samples were received on April 26, 2013 and were logged in under Katahdin Analytical Services work order number SG2820 for a hardcopy due date of May 15, 2013.

KATAHDIN Sample No.	TTNUS Sample Identification
SG2820-1	OU4-SS-M12-4S
SG2820-2	OU4-SS-M12-2S
SG2820-3	OU4-SS-M12-1S

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Jennifer Obrin**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of Work Order SG2820 were analyzed in accordance with "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846, 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis.

8270C SIM Analysis

Samples SG2820-1, 2 and 2DL2 were manually integrated for the analytes acenaphthylene, anthracene, dibenzo(a,h)anthracene, the surrogates pyrene-d10, the internal standards phenathrene-d10, naphthalene-d8, and/or chrysene-d12. The specific reason for the manual integration is indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

Sample SG2820-3DL2 had a high response for the internal standard perylene-d12 that resulted in a %D which was outside the DoD QSM acceptance limit of -50% to +100% of the response of the internal standard of the midpoint standard of the initial calibration. Since the internal standard responses for the undiluted analysis was acceptable, no further action was taken.

The independent check standard (file G8531) associated with the initial calibration on the G instrument on 05/02/2013 had low concentrations for the target analytes benzo(a)anthracene and dibenzo(a,h)anthracene, which exceeded the DoD QSM acceptance limit of ±20% of the expected value from the ICAL. The Independent Check Report consists of the full list of spiked analytes, but only the client's list of target analytes are evaluated.

The CV (file G8645) had high responses for the target analyte pyrene and the surrogate pyrene-d10, which resulted in %D's that were greater than the acceptance limit of 20% from DoD QSM Version 4.1.

There were no other protocol deviations or observations noted by the organics laboratory staff.

Metals Analysis

The samples of Katahdin Work Order SG2820 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods" SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA, and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Atomic Emission Spectroscopic Analysis (ICP)

Solid-matrix Katahdin Sample Numbers SG2820- (1-3) were digested for ICP analysis on 04/29/13 (QC Batch GD29ICS1) in accordance with USEPA Method 3050B. Katahdin Sample Number SG2820-3 was prepared in duplicate and with a matrix spiked aliquot.

ICP analyses of the Katahdin Work Order SG2820 sample digestates were performed using a Thermo iCAP 6500 ICP spectrometer in accordance with USEPA Method 6010C. All samples were analyzed within holding times and all analytical run QC criteria were met.

Matrix QC Summary

The measured recovery of lead in the matrix-spiked aliquot of Katahdin Sample Number SG2820 -3 is within the project acceptance criteria (80% - 120% recovery of the added element, if the native concentration is less than four times the amount added).

The measured recovery of lead in a post-digestion spike of Katahdin Sample Number SG2820 -3 is within the project acceptance criteria (75% - 125% recovery of the added element).

The sample duplicate analysis of Katahdin Sample Number SG2820 -3 is outside the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for lead.

The serial dilution analyses of Katahdin Sample Number SG2820 -3 is within the project acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the LOQ) for lead.

Reporting of Metals Results

Per client request, analytical results for client samples on Form I and preparation blanks on Form IIIP have been reported using the laboratory's limits of detection (LOD). All results were evaluated down to the laboratory's method detection limits (MDLs). Results that fall between the MDL and the LOQ are flagged with "J" in the C-qualifier column, and the measured concentration appears in the concentration column. Results that are less than the MDL are flagged with "U" in the C-qualifier column, and the LOD is listed in the concentration column. These LOQs, MDLs, and LODs have been adjusted for each sample based on the sample amounts used in preparation and analysis.

Analytical results on Forms VA, VD, VII, and IX for client samples, matrix QC samples (duplicates and matrix spikes), and laboratory control samples have been reported down to the laboratory's method detection limits (MDLs). Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column, and the measured concentration is listed in the concentration column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, LODs, MDLs, and LOQs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of Work Order SG2820 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Annual Book of ASTM Standards", Method D2216-98 "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass".

All analyses were performed within analytical holding times. All quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
051513

Leslie Dimond
Quality Assurance Officer

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Tetra Tech | Contact: Deb Cohen | Phone #: (412) 921-7090 | Fax #: ( )

Address: 661 Anderson Dr. Foster Plaza 7 Pittsburgh | State: PA | Zip Code: 15220

Purchase Order # | Proj. Name / No.: PNSY B178 / CTOWE37 | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign): Debra Seiken | Copies To:

LAB USE ONLY | WORK ORDER #: SG2820 | KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. ☐Y ☐N — Lead	Filt. ☐Y ☐N — PAHs	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	OU4-SS-M12-4S	4/26/13 07:50	Soil	1	X	X								
	OU4-SS-M12-2S	4/26/13 09:10	Soil	1	X	X								
	~~OU4-SS-M12-3S~~	~~4/26/13 09:10~~	(DUP)											
	OU4-SS-M12-1S	4/26/13 09:35	Soil	1	X	X								
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	4/26/13 1130	4-26-13 14:40			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	4/26/13 1130				

ORIGINAL

AS-COC1

HOLDTIME

SDG SG2820

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
M	MG/KG	OU4-SS-M12-2S	SG2820-002	NM	4/26/2013	4/29/2013	5/2/2013	3	3	6
M	MG/KG	OU4-SS-M12-4S	SG2820-001	NM	4/26/2013	4/29/2013	5/2/2013	3	3	6
M	MG/KG	OU4-SS-M12-1S	SG2820-003	NM	4/26/2013	4/29/2013	5/2/2013	3	3	6
TS	%	OU4-SS-M12-2S	SG2820-2	NM	4/26/2013	4/30/2013	5/1/2013	4	1	5
TS	%	OU4-SS-M12-1S	SG2820-3	NM	4/26/2013	4/30/2013	5/1/2013	4	1	5
TS	%	OU4-SS-M12-4S	SG2820-1	NM	4/26/2013	4/30/2013	5/1/2013	4	1	5
SIM	%	OU4-SS-M12-4S	SG2820-1DL	NM	4/26/2013	5/1/2013	5/10/2013	5	9	14
SIM	%	OU4-SS-M12-1S	SG2820-3	NM	4/26/2013	5/1/2013	5/9/2013	5	8	13
SIM	%	OU4-SS-M12-1S	SG2820-3DL2	NM	4/26/2013	5/1/2013	5/14/2013	5	13	18
SIM	%	OU4-SS-M12-2S	SG2820-2	NM	4/26/2013	5/1/2013	5/9/2013	5	8	13
SIM	%	OU4-SS-M12-2S	SG2820-2DL2	NM	4/26/2013	5/1/2013	5/14/2013	5	13	18
SIM	%	OU4-SS-M12-4S	SG2820-1	NM	4/26/2013	5/1/2013	5/9/2013	5	8	13
SIM	UG/KG	OU4-SS-M12-1S	SG2820-3DL2	NM	4/26/2013	5/1/2013	5/14/2013	5	13	18
SIM	UG/KG	OU4-SS-M12-2S	SG2820-2	NM	4/26/2013	5/1/2013	5/9/2013	5	8	13
SIM	UG/KG	OU4-SS-M12-2S	SG2820-2DL2	NM	4/26/2013	5/1/2013	5/14/2013	5	13	18

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	UG/KG	OU4-SS-M12-4S	SG2820-1	NM	4/26/2013	5/1/2013	5/9/2013	5	8	13
SIM	UG/KG	OU4-SS-M12-4S	SG2820-1DL	NM	4/26/2013	5/1/2013	5/10/2013	5	9	14
SIM	UG/KG	OU4-SS-M12-1S	SG2820-3	NM	4/26/2013	5/1/2013	5/9/2013	5	8	13

Sample nomenclature:

The composite samples will be labeled OU4-SS-M12-1 through OU4-SS-M12-4, with the last number indicating which area the sample was collected from (i.e., Area 1 through 4).

Analytical Requirements:

One composite soil sample will be collected from each area that has sufficient soil. Because of the limited number of samples and type of analyses, no duplicate samples or rinsate blanks will be collected.

Analyze soil samples for the following –

Analyte	CAS Number	Recommended Project QL Goal (From SAP)
PAHs (ug/kg)		
ACENAPHTHYLENE	208-96-8	70
ANTHRACENE	120-12-7	412
BENZO(A)ANTHRACENE (HMW PAH)	56-55-3	87
BENZO(A)PYRENE (HMW PAH)	50-32-8	143
CHRYSENE (HMW PAH)	218-01-9	128
DIBENZO(A,H)ANTHRACENE (HMW PAH)	53-70-3	21
FLUORANTHENE (HMW PAH)	206-44-0	200
FLUORENE	86-73-7	167
PYRENE (HMW PAH)	129-00-0	222
METALS (mg/kg)		
LEAD	7439-92-1	142

Form 5
Semivolatile Organic Instrument Performance Check

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37
Lab File ID : GD206.D
Instrument ID : GCMS-G

SDG : SG2820
Date Analyzed : 02-MAY-13
Time Analyzed : 11:48

m/e	Ion Abundance Criteria	% Relative Abundance		
51	30.0 - 60.0% of mass 198	30.8		
68	Less than 2.0% of mass 69	0.5	1.38	1
69	Less than 100.0% of mass 198	34.8		
70	Less than 2.0% of mass 69	0.2	0.49	1
127	40.0 - 60.0% of mass 198	54.3		
197	Less than 1.0% of mass 198	0.0		
198	Base Peak, 100% relative abundance	100		
199	5.0 - 9.0% of mass 198	6.7		
275	10.0 - 30.0% of mass 198	21.9		
365	1.0 - 100.0% of mass 198	3.0		
441	0.0 - 100.0% of mass 443	10.8	73.89	2
442	40.0 - 100.0% of mass 198	76.0		
443	17.0 - 23.0% of mass 442	14.7	19.28	3

1-Value is % mass 69
2-Value is % mass 443
3-Value is % mass 442

This check applies to the following samples, LCS, MS, MSD and standards:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Initial Calibration	WG123550-4	G8524.D	05/02/13	12:06
Initial Calibration	WG123550-7	G8525.D	05/02/13	12:48
Initial Calibration	WG123550-6	G8526.D	05/02/13	13:30
Initial Calibration	WG123550-5	G8527.D	05/02/13	14:12
Initial Calibration	WG123550-3	G8529.D	05/02/13	15:41
Initial Calibration	WG123550-2	G8530.D	05/02/13	16:24
Independent Source	WG123550-8	G8531.D	05/02/13	17:07
Method Blank Sample	WG123499-1	G8533.D	05/02/13	18:31
Laboratory Control S	WG123499-2	G8534.D	05/02/13	19:13
Laboratory Control S	WG123499-3	G8535.D	05/02/13	19:55

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SG2820
Project : Portsmouth Naval Shipyard CTO WE37 **Instrument ID:** GCMS-G
Lab File IDs : G8530.D G8529.D G8524.D **Column ID:**
G8527.D G8525.D **Calibration Date(s):** 02-MAY-13 12:06
02-MAY-13 16:24

	Level 1 0.200000(	Level 2 0.500000(	Level 3 1.0000	Level 4 2.0000	Level 6 8.0000		Crv New	b	m1	m2	%RSD	Max %RSD	
Acenaphthylene	1.85884	2.09109	2.23531	2.27281	1.97034		AVG		2.08568		8.38003	15.00000	O
Fluorene	1.37574	1.46336	1.49547	1.49800	1.67975		AVG		1.50246		7.37304	15.00000	O
Anthracene	1.23386	1.33747	1.40744	1.42240	1.05051		AVG		1.29034		11.8855(	15.00000	O
Fluoranthene	0.82433	0.92676	1.03571	1.08501	1.01356		AVG		0.97707		10.5226(	15.00000	O
Pyrene	2.21275	2.35073	2.27517	2.03332	1.91186		AVG		2.15677		8.35849	15.00000	O
Benzo(a)anthracene	3080	11884	41521	86165	847797		LNR	0.14321	1.11235		0.99900	0.99000	O
Chrysene	10574	27986	58577	131445	922736		LNR	-0.25335	1.18145		0.99718	0.99000	O
Benzo(a)pyrene	1.27394	1.34003	1.33887	1.34199	1.29677		AVG		1.31832		2.36487	15.00000	O
Dibenzo(a,h)anthracene	617	2280	7430	24438	277552		LNR	0.33944	0.70421		0.99515	0.99000	O
2-Methylnaphthalene-D10	0.49884	0.48738	0.64957	0.65056	0.43434		AVG		0.54414		18.3252(	15.00000	
Fluorene-D10	1.22626	1.12017	0.94079	0.96269	1.01992		AVG		1.05396		11.2632(	15.00000	
Pyrene-D10	1.39409	1.43400	1.40396	1.26172	1.21925		AVG		1.34260		7.11751	15.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

Form 5
Semivolatile Organic Instrument Performance Check

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37
Lab File ID : GD210.D
Instrument ID : GCMS-G

SDG : SG2820
Date Analyzed : 08-MAY-13
Time Analyzed : 13:22

m/e	Ion Abundance Criteria	% Relative Abundance		
51	30.0 - 60.0% of mass 198	35.3		
68	Less than 2.0% of mass 69	0.7	1.74	1
69	Less than 100.0% of mass 198	38.3		
70	Less than 2.0% of mass 69	0.3	0.83	1
127	40.0 - 60.0% of mass 198	55.4		
197	Less than 1.0% of mass 198	0.0		
198	Base Peak, 100% relative abundance	100		
199	5.0 - 9.0% of mass 198	6.8		
275	10.0 - 30.0% of mass 198	20.7		
365	1.0 - 100.0% of mass 198	2.4		
441	0.0 - 100.0% of mass 443	9.3	73.80	2
442	40.0 - 100.0% of mass 198	65.0		
443	17.0 - 23.0% of mass 442	12.5	19.30	3

1-Value is % mass 69
2-Value is % mass 443
3-Value is % mass 442

This check applies to the following samples, LCS, MS, MSD and standards:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Initial Calibration	WG123719-4	G8611.D	05/08/13	13:41
Initial Calibration	WG123719-7	G8612.D	05/08/13	14:24
Initial Calibration	WG123719-6	G8613.D	05/08/13	15:07
Initial Calibration	WG123719-5	G8614.D	05/08/13	15:49
Initial Calibration	WG123719-3	G8616.D	05/08/13	17:14
Initial Calibration	WG123719-2	G8617.D	05/08/13	17:57
Independent Source	WG123719-8	G8618.D	05/08/13	18:39

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SG2820
Project : Portsmouth Naval Shipyard CTO WE37 **Instrument ID:** GCMS-G
Lab File IDs : G8617.D G8616.D G8611.D **Column ID:**
G8614.D G8613.D G8612.D **Calibration Date(s):** 08-MAY-13 13:41
08-MAY-13 17:57

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Crv					Max	
	0.200000(	0.500000(	1.0000	2.0000	5.0000	8.0000	New	b	m1	m2	%RSD	%RSD	
Acenaphthylene	2.19448	2.20093	2.25556	2.36596	2.19928	2.10854	AVG		2.22079		3.84375	15.00000	O
Fluorene	1.60169	1.56527	1.55702	1.58381	1.39522	1.49474	AVG		1.53296		4.99916	15.00000	O
Anthracene	1.44803	1.46638	1.49851	1.47188	1.40796	1.17319	AVG		1.41099		8.52621	15.00000	O
Fluoranthene	1.10840	1.11766	1.17972	1.11967	1.04721	1.03178	AVG		1.10074		4.90292	15.00000	O
Pyrene	2.14537	2.13368	2.01014	1.92272	1.87896	2.17077	AVG		2.04361		6.09141	15.00000	O
Benzo(a)anthracene	1.17143	1.10720	1.26613	1.14797	1.11731	1.18469	AVG		1.16579		4.93635	15.00000	O
Chrysene	1.67322	1.50985	1.38548	1.28311	1.19620	1.22923	AVG		1.37951		13.3179[illegible]	15.00000	O
Benzo(a)pyrene	1.43954	1.37994	1.32236	1.33017	1.30520	1.27832	AVG		1.34259		4.32861	15.00000	O
Dibenzo(a,h)anthracene	0.59931	0.57764	0.78652	0.75773	0.83946	0.79249	AVG		0.72553		15.1015[illegible]	15.00000	W(
2-Methylnaphthalene-D10	0.57843	0.61069	0.54077	0.52854	0.49465	0.46375	AVG		0.53614		10.0046[illegible]	15.00000	
Fluorene-D10	1.09581	0.98494	1.01631	1.02648	0.91842	0.93504	AVG		0.99617		6.53072	15.00000	
Pyrene-D10	1.31397	1.29225	1.23238	1.18451	1.16021	1.36042	AVG		1.25729		6.20317	15.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

no samples affected

52700

< 20% RSD

00 Technology Way
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http://katahdinlab.com
sales@katahdinlab.com

Form 5
Semivolatile Organic Instrument Performance Check

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37
Lab File ID : GD211.D
Instrument ID : GCMS-G

SDG : SG2820
Date Analyzed : 09-MAY-13
Time Analyzed : 10:27

m/e	Ion Abundance Criteria	% Relative Abundance		
51	30.0 - 60.0% of mass 198	33.7		
68	Less than 2.0% of mass 69	0.6	1.48	1
69	Less than 100.0% of mass 198	37.4		
70	Less than 2.0% of mass 69	0.2	0.49	1
127	40.0 - 60.0% of mass 198	53.8		
197	Less than 1.0% of mass 198	0.3		
198	Base Peak, 100% relative abundance	100		
199	5.0 - 9.0% of mass 198	6.7		
275	10.0 - 30.0% of mass 198	22.0		
365	1.0 - 100.0% of mass 198	2.9		
441	0.0 - 100.0% of mass 443	10.8	73.28	2
442	40.0 - 100.0% of mass 198	74.9		
443	17.0 - 23.0% of mass 442	14.7	19.64	3

1-Value is % mass 69
2-Value is % mass 443
3-Value is % mass 442

This check applies to the following samples, LCS, MS, MSD and standards:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Continuing Calibrati	WG123853-2	G8630.D	05/09/13	10:49
OU4-SS-M12-2S	SG2820-2	G8637.D	05/09/13	15:54
OU4-SS-M12-1S	SG2820-3	G8638.D	05/09/13	16:37
OU4-SS-M12-4S	SG2820-1	G8639.D	05/09/13	17:20

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37 **SDG:** SG2820
Lab ID : WG123853-2 **Analytical Date:** 05/09/13 10:49
Lab File ID : G8630.D **Instrument ID:** GCMS-G
Initial Calibration Date(s): 05/08/13 13:41 05/08/13 17:57 **Column ID:**

Compound	RRF/Amount	RF1	CCAL RRF1	Min	%D/ %Drift	Max %D/ %Drift	Curve Type
39 Acenaphthylene	2.22079	2.30238	2.30238	0.010	3.67395	20.00000	Averaged
50 Fluorene	1.53296	1.59675	1.59675	0.010	4.16164	20.00000	Averaged
61 Anthracene	1.41099	1.60527	1.60527	0.010	13.76892	20.00000	Averaged
64 Fluoranthene	1.10074	1.22014	1.22014	0.010	10.84737	20.01000	Averaged
66 Pyrene	2.04361	1.98185	1.98185	0.010	-3.02208	20.00000	Averaged
68 Benzo(a)anthracene	1.16579	1.24327	1.24327	0.010	6.64649	20.00000	Averaged
70 Chrysene	1.37951	1.52029	1.52029	0.010	10.20456	20.00000	Averaged
76 Benzo(a)pyrene	1.34259	1.35534	1.35534	0.010	0.94971	20.01000	Averaged
79 Dibenzo(a,h)anthracene	0.72553	0.84402	0.84402	0.010	16.33226	20.00000	Averaged
26 2-Methylnaphthalene-D10	0.53614	0.49820	0.49820	0.010	-7.07680	20.00000	Averaged
48 Fluorene-D10	0.99617	1.18021	1.18021	0.010	18.47536	20.00000	Averaged
65 Pyrene-D10	1.25729	1.22507	1.22507	0.010	-2.56268	20.00000	Averaged

*** = Compound out of QC criteria**

Form 5
Semivolatile Organic Instrument Performance Check

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37
Lab File ID : GD212.D
Instrument ID : GCMS-G

SDG : SG2820
Date Analyzed : 10-MAY-13
Time Analyzed : 15:17

m/e	Ion Abundance Criteria	% Relative Abundance		
51	30.0 - 60.0% of mass 198	31.6		
68	Less than 2.0% of mass 69	0.5	1.38	1
69	Less than 100.0% of mass 198	35.5		
70	Less than 2.0% of mass 69	0.2	0.53	1
127	40.0 - 60.0% of mass 198	53.6		
197	Less than 1.0% of mass 198	0.0		
198	Base Peak, 100% relative abundance	100		
199	5.0 - 9.0% of mass 198	6.6		
275	10.0 - 30.0% of mass 198	22.8		
365	1.0 - 100.0% of mass 198	3.0		
441	0.0 - 100.0% of mass 443	11.9	72.84	2
442	40.0 - 100.0% of mass 198	84.7		
443	17.0 - 23.0% of mass 442	16.3	19.27	3

1-Value is % mass 69
2-Value is % mass 443
3-Value is % mass 442

This check applies to the following samples, LCS, MS, MSD and standards:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Continuing Calibrati	WG123937-2	G8645.D	05/10/13	15:35
OU4-SS-M12-4S	SG2820-1DL	G8646.D	05/10/13	16:17

Form 7
Calibration Verification Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37 **SDG:** SG2820
Lab ID : WG123937-2 **Analytical Date:** 05/10/13 15:35
Lab File ID : G8645.D **Instrument ID:** GCMS-G
Initial Calibration Date(s): 05/08/13 13:41 05/08/13 17:57 **Column ID:**

Compound	RRF/Amount	RF1	CCAL RRF1	Min	%D/ %Drift	Max %D/ %Drift	Curve Type	
39 Acenaphthylene	2.22079	2.08731	2.08731	0.010	-6.01048	20.00000	Averaged	
50 Fluorene	1.53296	1.53461	1.53461	0.010	0.10799	20.00000	Averaged	
61 Anthracene	1.41099	1.55246	1.55246	0.010	10.02666	20.00000	Averaged	
64 Fluoranthene	1.10074	1.06750	1.06750	0.010	-3.02007	20.01000	Averaged	
66 Pyrene	2.04361	2.70810	2.70810	0.010	32.51557	20.00000	Averaged	*
68 Benzo(a)anthracene	1.16579	1.08559	1.08559	0.010	-6.87896	20.00000	Averaged	
70 Chrysene	1.37951	1.59395	1.59395	0.010	15.54469	20.00000	Averaged	
76 Benzo(a)pyrene	1.34259	1.34927	1.34927	0.010	0.49761	20.01000	Averaged	
79 Dibenzo(a,h)anthracene	0.72553	0.72977	0.72977	0.010	0.58442	20.00000	Averaged	
26 2-Methylnaphthalene-D10	0.53614	0.51197	0.51197	0.010	-4.50788	20.00000	Averaged	
48 Fluorene-D10	0.99617	0.98752	0.98752	0.010	-0.86800	20.00000	Averaged	
65 Pyrene-D10	1.25729	1.71124	1.71124	0.010	36.10557	20.00000	Averaged	*

*** = Compound out of QC criteria**

Form 5
Semivolatile Organic Instrument Performance Check

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37
Lab File ID : GD213.D
Instrument ID : GCMS-G

SDG : SG2820
Date Analyzed : 13-MAY-13
Time Analyzed : 12:41

m/e	Ion Abundance Criteria	% Relative Abundance		
51	30.0 - 60.0% of mass 198	31.2		
68	Less than 2.0% of mass 69	0.5	1.42	1
69	Less than 100.0% of mass 198	34.7		
70	Less than 2.0% of mass 69	0.2	0.54	1
127	40.0 - 60.0% of mass 198	52.8		
197	Less than 1.0% of mass 198	0.0		
198	Base Peak, 100% relative abundance	100		
199	5.0 - 9.0% of mass 198	6.9		
275	10.0 - 30.0% of mass 198	22.4		
365	1.0 - 100.0% of mass 198	3.0		
441	0.0 - 100.0% of mass 443	11.2	72.86	2
442	40.0 - 100.0% of mass 198	80.1		
443	17.0 - 23.0% of mass 442	15.4	19.22	3

1-Value is % mass 69
2-Value is % mass 443
3-Value is % mass 442

This check applies to the following samples, LCS, MS, MSD and standards:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Initial Calibration	WG124003-4	G8662.D	05/13/13	13:00
Initial Calibration	WG124003-7	G8663.D	05/13/13	13:53
Initial Calibration	WG124003-6	G8664.D	05/13/13	14:36
Initial Calibration	WG124003-5	G8665.D	05/13/13	15:34
Initial Calibration	WG124003-3	G8667.D	05/13/13	16:58
Initial Calibration	WG124003-2	G8668.D	05/13/13	17:40
Independent Source	WG124003-8	G8669.D	05/13/13	18:22
OU4-SS-M12-2S	SG2820-2DL2	G8677.D	05/14/13	00:00
OU4-SS-M12-1S	SG2820-3DL2	G8678.D	05/14/13	00:41

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SG2820

Project : Portsmouth Naval Shipyard CTO WE37 **Instrument ID:** GCMS-G

Lab File IDs : G8668.D G8667.D G8662.D **Column ID:**
G8665.D G8664.D G8663.D **Calibration Date(s):** 13-MAY-13 13:00
13-MAY-13 17:40

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Crv					Max	
	0.200000(	0.500000(	1.0000	2.0000	5.0000	8.0000	New	b	m1	m2	%RSD	%RSD	
Acenaphthylene	2.00860	2.12781	2.10341	2.03648	2.01349	1.86692	AVG		2.02612		4.53602	15.00000	O
Fluorene	1.40843	1.44921	1.38244	1.33915	1.30181	1.28955	AVG		1.36177		4.59441	15.00000	O
Anthracene	1.30750	1.38472	1.12419	1.06303	1.02321	0.98152	AVG		1.14736		14.19065	15.00000	O
Fluoranthene	0.98319	1.06442	0.98631	0.97758	0.85522	0.92282	AVG		0.96492		7.27781	15.00000	O
Pyrene	2.04976	1.99118	2.41934	1.92426	2.25530	1.77918	AVG		2.06984		11.20217	15.00000	O
Benzo(a)anthracene	1.12823	1.12206	1.18220	1.13633	1.11292	1.06003	AVG		1.12363		3.50966	15.00000	O
Chrysene	1.37600	1.49189	1.39131	1.28489	1.23278	0.99202	AVG		1.29482		13.3934(	15.00000	O
Benzo(a)pyrene	1.41791	1.37992	1.29933	1.30185	1.26822	1.17352	AVG		1.30679		6.58509	15.00000	O
Dibenzo(a,h)anthracene	0.61919	0.70875	0.75897	0.69807	0.82166	0.73281	AVG		0.72324		9.32108	15.00000	O
2-Methylnaphthalene-D10	0.58115	0.59514	0.54139	0.53924	0.51110	0.46669	AVG		0.53912		8.67688	15.00000	
Fluorene-D10	0.91595	0.92483	0.90251	0.87350	0.87631	0.82697	AVG		0.88668		4.03807	15.00000	
Pyrene-D10	1.22935	1.27231	1.50256	1.17987	1.38514	1.12646	AVG		1.28262		10.84661	15.00000	

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

Form 2
System Monitoring Compound Recovery

Lab Name: Katahdin Analytical Services **Project:** Portsmouth Naval Shipyard CTO WE37 **Matrix:** SL
Lab Code: KAS **SDG:** SG2820

Client Sample ID	Lab Sample ID	Col. ID	2MN	#	FLO	#	PYR	#
OU4-SS-M12-4S	SG2820-1		41.3		45.8		56.9	
OU4-SS-M12-4S	SG2820-1DL		0.00	D	0.00	D	0.00	D
OU4-SS-M12-2S	SG2820-2		52.2		62.5		52.2	
OU4-SS-M12-2S	SG2820-2DL2		0.00	D	0.00	D	0.00	D
OU4-SS-M12-1S	SG2820-3		57.2		61.6		68.6	
OU4-SS-M12-1S	SG2820-3DL2		0.00	D	0.00	D	0.00	D
Method Blank Sample	WG123499-1		55.9		47.7		64.6	
Laboratory Control S	WG123499-2		59.9		57.6		72.8	
Laboratory Control S	WG123499-3		47.7		51.6		66.7	

		QC Limits
PYR	PYRENE-D10	31-128
FLO	FLUORENE-D10	20-96
2MN	2-METHYLNAPHTHALENE-D10	19-94

= Column to be used to flag recovery limits.
* = Values outside of contract required QC limits.
D= System Monitoring Compound diluted out.

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http://katahdinlab.com
sales@katahdinlab.com

Method Blank Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTO WE37
Lab File ID : G8533.D
Instrument ID : GCMS-G
Matrix : SL

SDG : SG2820
Lab Sample ID : WG123499-1
Date Extracted : 01-MAY-13
Date Analyzed : 02-MAY-13
Time Analyzed : 18:31

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG123499-2	G8534.D	05/02/13	19:13
Laboratory Control S	WG123499-3	G8535.D	05/02/13	19:55
OU4-SS-M12-2S	SG2820-2	G8637.D	05/09/13	15:54
OU4-SS-M12-1S	SG2820-3	G8638.D	05/09/13	16:37
OU4-SS-M12-4S	SG2820-1	G8639.D	05/09/13	17:20
OU4-SS-M12-4S	SG2820-1DL	G8646.D	05/10/13	16:17
OU4-SS-M12-2S	SG2820-2DL2	G8677.D	05/14/13	00:00
OU4-SS-M12-1S	SG2820-3DL2	G8678.D	05/14/13	00:41

Report of Analytical Results

Client:
Lab ID: WG123499-1
Client ID: Method Blank Sample
Project:
SDG: SG2820
Lab File ID: G8533.D

Sample Date:
Received Date:
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499

Analysis Date: 02-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: NA
Report Date: 14-MAY-13

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acenaphthylene	U	10.	ug/Kgdrywt	1	20	20.	1.2	10.
Fluorene	U	10.	ug/Kgdrywt	1	20	20.	3.2	10.
Anthracene	U	10.	ug/Kgdrywt	1	20	20.	1.2	10.
Fluoranthene	U	10.	ug/Kgdrywt	1	20	20.	1.8	10.
Pyrene	U	10.	ug/Kgdrywt	1	20	20.	2.1	10.
Benzo(a)anthracene	U	10.	ug/Kgdrywt	1	20	20.	1.9	10.
Chrysene	U	10.	ug/Kgdrywt	1	20	20.	1.7	10.
Benzo(a)pyrene	U	10.	ug/Kgdrywt	1	20	20.	3.3	10.
Dibenzo(a,h)anthracene	U	10.	ug/Kgdrywt	1	20	20.	1.8	10.
2-Methylnaphthalene-D10		55.9	%					
Fluorene-D10		47.7	%					
Pyrene-D10		64.6	%					

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LCS/LCSD Recovery Report

LCS ID: WG123499-2
LCSD ID: WG123499-3
Project:
SDG: SG2820
Report Date: 14-MAY-13
LCS File ID: G8534.D

Received Date:
Extract Date: 01-MAY-13
Extracted By: JMS
Extraction Method: SW846 3550
Lab Prep Batch: WG123499
LCSD File ID: G8535.D

Analysis Date: 02-MAY-13
Analyst: JCG
Analysis Method: SW846 M8270D
Matrix: SL
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Acenaphthylene	66.7	43.7	65.5	35.4	53.1	ug/Kgdrywt	21	50	25-94
Fluorene	66.7	44.8	67.2	40.6	60.9	ug/Kgdrywt	10	50	40-92
Anthracene	66.7	54.9	82.3	49.0	73.5	ug/Kgdrywt	11	50	34-96
Fluoranthene	66.7	66.3	99.4	58.3	87.4	ug/Kgdrywt	13	50	38-116
Pyrene	66.7	52.5	78.7	48.0	72.0	ug/Kgdrywt	9	50	35-111
Benzo(a)anthracene	66.7	53.2	79.8	50.2	75.3	ug/Kgdrywt	6	50	48-100
Chrysene	66.7	60.7	91.0	54.0	81.0	ug/Kgdrywt	12	50	46-101
Benzo(a)pyrene	66.7	53.2	79.8	48.4	72.6	ug/Kgdrywt	9	50	61-101
Dibenzo(a,h)anthracene	66.7	51.5	77.2	46.4	69.6	ug/Kgdrywt	10	50	55-105
2-Methylnaphthalene-D10			59.9		47.7				19-94
Fluorene-D10			57.6		51.6				20-96
Pyrene-D10			72.8		66.7				31-128

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Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTC
Lab ID : WG123550-4
Lab File ID : G8524.D

SDG: SG2820
Analytical Date: 05/02/13 12:06
Instrument ID: GCMS-G

		1,4-DICHLOROBENZENE-D4			NAPHTHALENE-D8			ACENAPHTHENE-D10		
		Area	#	RT	#	Area	#	RT	#	Area	#	RT	#
	Std .	35798		9.07		89263		11.88		46288		15.97	
	Upper Limit	71596		9.57		178526		12.38		92576		16.47	
	Lower Limit	17899		8.57		44631.5		11.38		23144		15.47	
Client Sample ID	Lab Sample ID												
Method Blank Sample	WG123499-1	29929		9.07		102327		11.88		45705		15.97	
Laboratory Control S	WG123499-2	29991		9.07		103672		11.88		48101		15.97	
Laboratory Control S	WG123499-3	30792		9.07		104204		11.88		45933		15.97	

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTC
Lab ID : WG123550-4
Lab File ID : G8524.D

SDG: SG2820
Analytical Date: 05/02/13 12:06
Instrument ID: GCMS-G

		PHENANTHRENE-D10			CHRYSENE-D12			PERYLENE-D12		
		Area	#	RT #	Area	#	RT #	Area	#	RT #
	Std .	65185		19.47	32364		25.78	16623		28.92
	Upper Limit	130370		19.97	64728		26.28	33246		29.42
	Lower Limit	32592.5		18.97	16182		25.28	8311.5		28.42
Client Sample ID	Lab Sample ID									
Method Blank Sample	WG123499-1	72547		19.47	42364		25.76	25840		28.93
Laboratory Control S	WG123499-2	78513		19.45	48265		25.75	29522		28.91
Laboratory Control S	WG123499-3	70220		19.45	42000		25.76	26199		28.91

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTC
Lab ID : WG123719-4
Lab File ID : G8611.D

SDG: SG2820
Analytical Date: 05/08/13 13:41
Instrument ID: GCMS-G

		1,4-DICHLOROBENZENE-D4				NAPHTHALENE-D8				ACENAPHTHENE-D10			
		Area	#	RT	#	Area	#	RT	#	Area	#	RT	#
	Std .	26835		9.04		92063		11.85		38548		15.94	
	Upper Limit	53670		9.54		184126		12.35		77096		16.44	
	Lower Limit	13417.5		8.54		46031.5		11.35		19274		15.44	
Client Sample ID	Lab Sample ID												
Continuing Calibrati	WG123853-2	23575		9.04		102398		11.85		39681		15.94	
OU4-SS-M12-2S	SG2820-2	27829		9.05		107646		11.85		46673		15.94	
OU4-SS-M12-1S	SG2820-3	28609		9.05		104720		11.85		48115		15.94	
OU4-SS-M12-4S	SG2820-1	30364		9.05		112331		11.85		48734		15.96	
Continuing Calibrati	WG123937-2	35284		9.02		124701		11.85		52965		15.93	
OU4-SS-M12-4S	SG2820-1DL	29230		9.04		111648		11.85		50995		15.92	

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTC
Lab ID : WG123719-4
Lab File ID : G8611.D

SDG: SG2820
Analytical Date: 05/08/13 13:41
Instrument ID: GCMS-G

		PHENANTHRENE-D10			CHRYSENE-D12			PERYLENE-D12		
		Area	#	RT	#	Area	#	RT	#	Area	#	RT	#
	Std .	59574		19.44		36520		25.72		28183		28.87	
	Upper Limit	119148		19.94		73040		26.22		56366		29.37	
	Lower Limit	29787		18.94		18260		25.22		14091.5		28.37	
Client Sample ID	Lab Sample ID												
Continuing Calibrati	WG123853-2	59852		19.44		38759		25.74		29932		28.89	
OU4-SS-M12-2S	SG2820-2	47670		19.48		36443		25.83		35129		28.93	
OU4-SS-M12-1S	SG2820-3	72339		19.46		38792		25.79		35988		28.93	
OU4-SS-M12-4S	SG2820-1	61942		19.50		26390		25.89		36021		28.99	
Continuing Calibrati	WG123937-2	81756		19.42		33348		25.72		14910		28.87	
OU4-SS-M12-4S	SG2820-1DL	82358		19.42		37338		25.70		19659		28.86	

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTC
Lab ID : WG124003-4
Lab File ID : G8662.D

SDG: SG2820
Analytical Date: 05/13/13 13:00
Instrument ID: GCMS-G

		1,4-DICHLOROBENZENE-D4			NAPHTHALENE-D8			ACENAPHTHENE-D10		
		Area	#	RT	#	Area	#	RT	#	Area	#	RT	#
	Std .	27991		8.98		95341		11.80		42213		15.89	
	Upper Limit	55982		9.48		190682		12.30		84426		16.39	
	Lower Limit	13995.5		8.48		47670.5		11.30		21106.5		15.39	
Client Sample ID	Lab Sample ID												
OU4-SS-M12-2S	SG2820-2DL2	30790		9.00		111820		11.80		43626		15.89	
OU4-SS-M12-1S	SG2820-3DL2	29246		9.00		103595		11.80		42661		15.89	

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Portsmouth Naval Shipyard CTC
Lab ID : WG124003-4
Lab File ID : G8662.D

SDG: SG2820
Analytical Date: 05/13/13 13:00
Instrument ID: GCMS-G

		PHENANTHRENE-D10			CHRYSENE-D12			PERYLENE-D12		
		Area	#	RT	#	Area	#	RT	#	Area	#	RT	#
	Std .	63834		19.37		26478		25.66		14759		28.80	
	Upper Limit	127668		19.87		52956		26.16		29518		29.30	
	Lower Limit	31917		18.87		13239		25.16		7379.5		28.30	
Client Sample ID	Lab Sample ID												
OU4-SS-M12-2S	SG2820-2DL2	72191		19.37		33147		25.66		21871		28.80	
OU4-SS-M12-1S	SG2820-3DL2	73276		19.37		44574		25.66		32972	*	28.80	

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Data File: \\target_server\GG\chem\gcms-g.i\G051013.b\G8646.D
Report Date: 14-May-2013 11:29

Katahdin Analytical Services

Data file : \\target_server\GG\chem\gcms-g.i\G051013.b\G8646.D
Lab Smp Id: SG2820-1DL Client Smp ID: OU4-SS-M12-4S
Inj Date : 10-MAY-2013 16:17 MS Autotune Date: 20-SEP-2006 14:50
Operator : JCG Inst ID: gcms-g.i
Smp Info : SG2820-1DL
Misc Info : WG123937,WG123499,WG123719-4
Comment :
Method : \\target_server\GG\chem\gcms-g.i\G051013.b\gspsim75.m
Meth Date : 13-May-2013 08:48 cgomez Quant Type: ISTD
Cal Date : 08-MAY-2013 17:57 Cal File: G8617.D
Als bottle: 3
Dil Factor: 100.00000
Integrator: HP RTE Compound Sublist: ttwe37pns.sub
Target Version: 4.12

5-20-13 JAJ

Concentration Formula: Amt * DF * (Vt/Ws*Vi)*(100/(100-M))*1000 * CpndVariable

Name	Value	Description
DF	100.000	Dilution Factor
Vt	0.00100	Final Volume (L)
Ws	0.03900	Weight of Sample (Kg)
Vi	1.000	Volume injected (uL)
M	41.097	% Moisture
Cpnd Variable		Local Compound Variable

$= \frac{519930\ (0.8\ ng)\ (1000\ ul)}{(37338)\ (2.04361)\ (39)\ (0.589\ g)\ (1\ ul)}$

$= 73.739\ ug/Kg$

CONCENTRATIONS

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	ON-COLUMN (ug/ml)	FINAL (ug/Kgdrywt)	REVIEW C
* 7 1,4-Dichlorobenzene-D4	152	9.036	9.018	(1.000)	29230	0.80000		
* 20 Naphthalene-D8	136	11.847	11.846	(1.000)	111648	0.80000		
* 41 Acenaphthene-D10	164	15.923	15.925	(1.000)	50995	0.80000		
50 Fluorene	166	17.211	17.212	(1.081)	83391	0.85340	3710	
* 59 Phenanthrene-D10	188	19.415	19.416	(1.000)	82358	0.80000		
61 Anthracene	178	19.586	19.587	(1.009)	211889	1.45871	6350	
64 Fluoranthene	202	22.291	22.290	(1.148)	673846	5.94647	25900	
66 Pyrene	202	22.794	22.809	(0.887)	519930	5.45113	23700	
68 Benzo(a)anthracene	228	25.679	25.697	(0.999)	129898	2.38738	10400	
* 69 Chrysene-D12	240	25.698	25.717	(1.000)	37338	0.80000		
70 Chrysene	228	25.755	25.774	(1.002)	158569	2.46281	10700	
76 Benzo(a)pyrene	252	28.732	28.749	(0.996)	56612	1.71591	7470	
* 77 Perylene-D12	264	28.855	28.871	(1.000)	19659	0.80000		
79 Dibenzo(a,h)anthracene	278	31.077	31.090	(1.077)	3656	0.20506	893(a)	

QC Flag Legend

a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICV

File: IGE01A May 01, 2013 13:43

Analyte	True	Found	%R (1)
ALUMINUM	10000.0	9728.00	97.3
CALCIUM	10000.0	10110.00	101.1
IRON	10000.0	10080.00	100.8
LEAD	400.0	409.10	102.3
MAGNESIUM	10000.0	10450.00	104.5

SAMPLE: CCV

File: IGE01A May 01, 2013 14:19

Analyte	True	Found	%R (1)
ALUMINUM	12500.0	12460.00	99.7
CALCIUM	12500.0	12570.00	100.6
IRON	12500.0	12610.00	100.9
LEAD	500.0	516.60	103.3
MAGNESIUM	12500.0	12900.00	103.2

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: CCV

File: IGE01A May 01, 2013 15:13

Analyte	True	Found	%R (1)
ALUMINUM	12500.0	12610.00	100.9
CALCIUM	12500.0	12750.00	102.0
IRON	12500.0	12840.00	102.7
LEAD	500.0	509.50	101.9
MAGNESIUM	12500.0	12720.00	101.8

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICV

File: IGE02A May 02, 2013 14:38

Analyte	True	Found	%R (1)
ALUMINUM	10000.0	9715.00	97.2
CALCIUM	10000.0	10080.00	100.8
IRON	10000.0	10060.00	100.6
LEAD	400.0	408.90	102.2
MAGNESIUM	10000.0	10390.00	103.9

SAMPLE: CCV

File: IGE02A May 02, 2013 15:14

Analyte	True	Found	%R (1)
ALUMINUM	12500.0	12630.00	101.0
CALCIUM	12500.0	12620.00	101.0
IRON	12500.0	12580.00	100.6
LEAD	500.0	516.20	103.2
MAGNESIUM	12500.0	12950.00	103.6

(1) Control Limits: Mercury 80-120; Other Metals 90-110

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: CCV

File: IGE02A May 02, 2013 16:07

Analyte	True	Found	%R (1)
ALUMINUM	12500.0	12920.00	103.4
CALCIUM	12500.0	12870.00	103.0
IRON	12500.0	12870.00	103.0
LEAD	500.0	515.90	103.2
MAGNESIUM	12500.0	12920.00	103.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICV

File: IGE06A May 06, 2013 16:15

Analyte	True	Found	%R (1)
ALUMINUM	10000.0	10070.00	100.7
CALCIUM	10000.0	10320.00	103.2
IRON	10000.0	10370.00	103.7
LEAD	400.0	416.00	104.0
MAGNESIUM	10000.0	10580.00	105.8

SAMPLE: CCV

File: IGE06A May 06, 2013 16:51

Analyte	True	Found	%R (1)
ALUMINUM	12500.0	12790.00	102.3
CALCIUM	12500.0	12860.00	102.9
IRON	12500.0	12970.00	103.8
LEAD	500.0	510.80	102.2
MAGNESIUM	12500.0	12760.00	102.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: CCV

File: IGE06A May 06, 2013 17:45

Analyte	True	Found	%R (1)
ALUMINUM	12500.0	12750.00	102.0
CALCIUM	12500.0	12740.00	101.9
IRON	12500.0	12830.00	102.6
LEAD	500.0	521.90	104.4
MAGNESIUM	12500.0	12990.00	103.9

(1) Control Limits: Mercury 80-120; Other Metals 90-110

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: PQL

File: IGE01A May 01, 2013 13:51

Analyte	TRUE	FOUND	% R
ALUMINUM	300.0	345.10	115.0
CALCIUM	100.0	102.10	102.1
IRON	100.0	106.80	106.8
LEAD	5.0	5.50	110.0
MAGNESIUM	100.0	116.60	116.6

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: PQL

File: IGE02A May 02, 2013 14:47

Analyte	TRUE	FOUND	% R
ALUMINUM	300.0	301.80	100.6
CALCIUM	100.0	106.00	106.0
IRON	100.0	102.50	102.5
LEAD	5.0	4.44	88.8
MAGNESIUM	100.0	121.10	121.1•

lead only reported

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: PQL

File: IGE06A May 06, 2013 16:24

Analyte	TRUE	FOUND	% R
ALUMINUM	300.0	327.20	109.1
CALCIUM	100.0	112.60	112.6
IRON	100.0	107.20	107.2
LEAD	5.0	5.61	112.2
MAGNESIUM	100.0	116.70	116.7

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICB

File: IGE01A May 01, 2013 13:47

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	4.737	J
LEAD	1.040	U
MAGNESIUM	7.720	U

SAMPLE: CCB

File: IGE01A May 01, 2013 14:23

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	5.117	J
LEAD	1.040	U
MAGNESIUM	7.720	U

SAMPLE: CCB

File: IGE01A May 01, 2013 15:17

Analyte	Result	C
ALUMINUM	20.220	J
CALCIUM	8.730	U
IRON	3.950	U
LEAD	1.040	U
MAGNESIUM	7.720	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICB

File: IGE02A May 02, 2013 14:42

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	3.950	U
LEAD	1.040	U
MAGNESIUM	7.720	U

SAMPLE: CCB

File: IGE02A May 02, 2013 15:19

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	3.950	U
LEAD	-1.076	J
MAGNESIUM	7.720	U

SAMPLE: CCB

File: IGE02A May 02, 2013 16:12

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	3.950	U
LEAD	1.040	U
MAGNESIUM	7.720	U

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICB

File: IGE06A May 06, 2013 16:19

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	5.715	J
LEAD	1.040	U
MAGNESIUM	7.720	U

SAMPLE: CCB

File: IGE06A May 06, 2013 16:56

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	3.950	U
LEAD	1.040	U
MAGNESIUM	7.720	U

SAMPLE: CCB

File: IGE06A May 06, 2013 17:50

Analyte	Result	C
ALUMINUM	16.800	U
CALCIUM	8.730	U
IRON	3.950	U
LEAD	1.040	U
MAGNESIUM	7.720	U

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSGD29ICS1

Matrix: SOIL **SDG Name:** SG2820

QC Batch ID: GD29ICS1

Concentration Units : mg/Kgdrywt

Analyte	RESULT	C
LEAD	0.197	J

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICSA

File: IGE01A May 01, 2013 14:10

Analyte	TRUE	FOUND	% R
ALUMINUM	500000	487700	97.5
CALCIUM	500000	457400	91.5
IRON	200000	187700	93.8
LEAD	0	-1	
MAGNESIUM	500000	443000	88.6

SAMPLE: ICSAB

File: IGE01A May 01, 2013 14:15

Analyte	TRUE	FOUND	% R
ALUMINUM	500000	485200	97.0
CALCIUM	500000	464100	92.8
IRON	200000	187500	93.8
LEAD	50	42	84.0
MAGNESIUM	500000	438800	87.8

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICSA

File: IGE02A May 02, 2013 15:05

Analyte	TRUE	FOUND	% R
ALUMINUM	500000	486700	97.3
CALCIUM	500000	466000	93.2
IRON	200000	186300	93.2
LEAD	0	2	
MAGNESIUM	500000	440100	88.0

SAMPLE: ICSAB

File: IGE02A May 02, 2013 15:10

Analyte	TRUE	FOUND	% R
ALUMINUM	500000	491600	98.3
CALCIUM	500000	469900	94.0
IRON	200000	186800	93.4
LEAD	50	43	86.0
MAGNESIUM	500000	445500	89.1

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Concentration Units: ug/L

SAMPLE: ICSA

File: IGE06A May 06, 2013 16:42

Analyte	TRUE	FOUND	% R
ALUMINUM	500000	500300	100.1
CALCIUM	500000	468600	93.7
IRON	200000	186000	93.0
LEAD	0	1	
MAGNESIUM	500000	439400	87.9

SAMPLE: ICSAB

File: IGE06A May 06, 2013 16:47

Analyte	TRUE	FOUND	% R
ALUMINUM	500000	487100	97.4
CALCIUM	500000	471700	94.3
IRON	200000	189300	94.7
LEAD	50	42	84.0
MAGNESIUM	500000	443200	88.6

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** OU4-SS-M12-1SS

Matrix: SOIL | **SDG Name:** SG2820

Percent Solids: 74.6 | **Lab Sample ID:** SG2820-003S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
LEAD, TOTAL	8688.0380		3518.2084		10.64	48588.6		80	120	P

Comments:

OK
Sp. ice added
<4X Result

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** OU4-SS-M12-1SS

Matrix: SOIL **SDG Name:** SG2820

Percent Solids: 74.6 **Lab Sample ID:** SG2820-003A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
LEAD, TOTAL	7026.0000		6612.0000		500	82.8		75	125	P

Comments:

DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** OU4-SS-M12-1SD

Matrix: SOIL **SDG Name:** SG2820

Percent Solids: 74.6 **Lab Sample ID:** SG2820-003D

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Sample Result	C	Duplicate Result	C	RPD	Q	M
LEAD, TOTAL		3518.2084		2017.3660		54.2	*	P

Comments:

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSOGD29ICS1

Matrix: SOIL **SDG Name:** SG2820

QC Batch ID: GD29ICS1

Concentration Units : mg/Kgdrywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
LEAD	10.00	10.05	100.5	80	120

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** OU4-SS-M12-1SL

Matrix: SOIL **SDG Name:** SG2820

Lab Sample ID: SG2820-003L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
LEAD, TOTAL	6612.00		6688.00		1.1		P

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** I

Instrument Name: THERMO ICAP 6500 **Date:** 5/21/2012

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	300	16.80	P
CALCIUM	100	8.73	P
IRON	100	3.95	P
LEAD	5.0	1.04	P
MAGNESIUM	100	7.72	P

LIMITS of DETECTION

Lab Name: Katahdin Analytical Services **Instrument Code:** I

Instrument Name: THERMO ICAP 6500 **Date:** 1/20/2011

Analyte	LOD	Units	M	EPA Prep./Anal. Method
LEAD	0.40	mg/Kg	P	SW846 3050B / SW846 6010C

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** I

Instrument Name: THERMO ICAP 6500 **Date:** 1/20/2011

Analyte	MDL	Units	M	EPA Prep./Anal. Method
LEAD	0.09	mg/Kg	P	SW846 3050B / SW846 6010C

ICP INTERELEMENT CORRECTION FACTORS

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Instrument Name: THERMO ICAP 6500 **Instrument ID:** I **Date:** 12/5/2011

Analyte	Wavelength (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	As	Cr	Co	Cu	Mn	Mo	Ni	Ti	V
ALUMINUM	396.15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0443000	0.0	0.0	0.0
ANTIMONY	206.83	0.0000030	0.0	0.0000460	0.0	-0.0001490	0.0106000	0.0	0.0	0.0	-0.0039900	-0.0009470	0.0	-0.0007350
ARSENIC	189.04	0.0000030	0.0	-0.0002090	0.0	0.0	0.0001970	0.0	0.0	0.0	0.0004240	0.0	0.0	0.0
BARIUM	455.40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BERYLLIUM	313.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0006860	0.0003880
BORON	208.96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0534000	0.0	0.0	0.0
CADMIUM	226.50	0.0	0.0	0.0000940	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0000800	0.0000910	0.0
CALCIUM	315.89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHROMIUM	267.72	0.0	0.0	0.0000100	0.0	0.0	0.0	0.0	0.0	0.0001110	0.0	0.0	0.0	0.0000720
COBALT	228.62	0.0	0.0	0.0000100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0002140	0.0017700	0.0
COPPER	327.40	0.0000030	0.0	0.0000010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0006350	0.0000910
IRON	259.94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LEAD	220.35	-0.0001520	0.0	0.0000300	0.0	0.0	0.0	0.0000540	0.0009460	0.0	-0.0006970	0.0002080	0.0000970	0.0
LITHIUM	670.78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAGNESIUM	202.58	0.0	0.0	0.0000190	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0007070	0.0
MANGANESE	257.61	0.0000009	0.0	0.0000100	-0.0000037	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOLYBDENUM	202.03	0.0	0.0	0.0	0.0	0.0	0.0001080	0.0	0.0	0.0	0.0	0.0	0.0	-0.0001920
NICKEL	231.60	0.0	0.0	-0.0000390	0.0	0.0	0.0	-0.0001380	0.0	0.0	0.0005880	0.0	0.0	0.0
POTASSIUM	766.49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SELENIUM	196.09	0.0000180	0.0	0.0000160	0.0	-0.0001750	0.0	0.0001290	0.0	0.0008190	0.0	0.0	0.0	-0.0002070
SILICON	251.61	0.0	0.0	-0.0001400	0.0	0.0	0.0	0.0	0.0	0.0	0.0116000	0.0	0.0009940	0.0
SILVER	328.07	0.0	0.0	-0.0004020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0009490	0.0
SODIUM	589.59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STRONTIUM	421.55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THALLIUM	190.86	0.0000050	0.0	0.0000050	0.0	0.0	0.0	0.0046300	-0.0001610	-0.0014000	-0.0000380	0.0	-0.0011200	-0.0009970
TIN	189.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TITANIUM	334.90	0.0	0.0	0.0	0.0	0.0	0.0001290	0.0	0.0	0.0	0.0004770	0.0	0.0	0.0
VANADIUM	292.40	0.0	0.0	0.0000110	0.0	0.0	-0.0043000	0.0	0.0	-0.0006810	-0.0049500	0.0	0.0007110	0.0
ZINC	206.20	0.0	0.0	0.0	0.0	0.0	-0.0011400	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FORM XI - IN

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** 1

Instrument Name: THERMO ICAP 6500 **Date:** 6/22/2012

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	5.00	1000000	P
CALCIUM	5.00	1000000	P
IRON	5.00	300000	P
LEAD	45.00	20000	P
MAGNESIUM	45.00	500000	P

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** GD29ICS1

Matrix: SOIL **SDG Name:** SG2820

Method: P **Prep Date:** 04/29/2013

Client ID	Lab Sample ID	Initial (g)	Final (L)	Bottle ID
LCSOGD29ICS1	LCSOGD29ICS1	1	0.1	
PBSGD29ICS1	PBSGD29ICS1	1	0.1	
OU4-SS-M12-4S	SG2820-001	1.71	0.1	A
OU4-SS-M12-2S	SG2820-002	1.53	0.1	A
OU4-SS-M12-1S	SG2820-003	1.26	0.1	A
OU4-SS-M12-1SD	SG2820-003D	1.33	0.1	A
OU4-SS-M12-1SS	SG2820-003S	1.26	0.1	A

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Instrument ID: THERMO ICAP 6500 **File Name:** IGE01A

Date: 5/1/2013 **Method:** P

Lab Sample ID	Client ID	D.F.	Time			Elements
Blank		1	13:34	AL	CA	FE PB MG
Std 1		1	13:38	AL	CA	FE PB MG
ICV		1	13:43	AL	CA	FE PB MG
ICB		1	13:47	AL	CA	FE PB MG
PQL		1	13:51	AL	CA	FE PB MG
ZZZZZZ		1	13:56			
ZZZZZZ		1	14:01			
ICSA		1	14:10	AL	CA	FE PB MG
ICSAB		1	14:15	AL	CA	FE PB MG
CCV		1	14:19	AL	CA	FE PB MG
CCB		1	14:23	AL	CA	FE PB MG
LCSOGD29ICS1		1	14:28			PB
PBSGD29ICS1		1	14:32			PB
ZZZZZZ		1	14:37			
ZZZZZZ		1	14:41			
ZZZZZZ		1	14:46			
ZZZZZZ		1	14:50			
ZZZZZZ		1	14:55			
ZZZZZZ		1	15:00			
ZZZZZZ		1	15:04			
ZZZZZZ		1	15:09			
CCV		1	15:13	AL	CA	FE PB MG
CCB		1	15:17	AL	CA	FE PB MG

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Instrument ID: THERMO ICAP 6500 **File Name:** IGE02A

Date: 5/2/2013 **Method:** P

Lab Sample ID	Client ID	D.F.	Time	Elements
Blank		1	14:29 AL	CA FE PB MG
Std 1		1	14:34 AL	CA FE PB MG
ICV		1	14:38 AL	CA FE PB MG
ICB		1	14:42 AL	CA FE PB MG
PQL		1	14:47 AL	CA FE PB MG
ZZZZZZ		1	14:51	
ZZZZZZ		1	14:56	
ICSA		1	15:05 AL	CA FE PB MG
ICSAB		1	15:10 AL	CA FE PB MG
CCV		1	15:14 AL	CA FE PB MG
CCB		1	15:19 AL	CA FE PB MG
ZZZZZZ		1	15:23	
ZZZZZZ		1	15:28	
ZZZZZZ		1	15:32	
ZZZZZZ		5	15:36	
SG2820-001	OU4-SS-M12-4S	5	15:41	PB
SG2820-002	OU4-SS-M12-2S	5	15:45	PB
SG2820-003	OU4-SS-M12-1S	5	15:50	PB
SG2820-003L	OU4-SS-M12-1SL	25	15:54	PB
SG2820-003A	OU4-SS-M12-1SA	5	15:59	PB
SG2820-003D	OU4-SS-M12-1SD	5	16:03	PB
CCV		1	16:07 AL	CA FE PB MG
CCB		1	16:12 AL	CA FE PB MG

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SG2820

Instrument ID: THERMO ICAP 6500 **File Name:** IGE06A

Date: 5/6/2013 **Method:** P

Lab Sample ID	Client ID	D.F.	Time		Elements
Blank		1	16:06 AL	CA	FE PB MG
Std 1		1	16:10 AL	CA	FE PB MG
ICV		1	16:15 AL	CA	FE PB MG
ICB		1	16:19 AL	CA	FE PB MG
PQL		1	16:24 AL	CA	FE PB MG
ZZZZZZ		1	16:28		
ZZZZZZ		1	16:33		
ICSA		1	16:42 AL	CA	FE PB MG
ICSAB		1	16:47 AL	CA	FE PB MG
CCV		1	16:51 AL	CA	FE PB MG
CCB		1	16:56 AL	CA	FE PB MG
ZZZZZZ		2	17:00		
SG2820-003S	OU4-SS-M12-1SS	10	17:05		PB
ZZZZZZ		10	17:09		
ZZZZZZ		5	17:14		
ZZZZZZ		2	17:18		
ZZZZZZ		10	17:23		
ZZZZZZ		50	17:27		
ZZZZZZ		10	17:32		
ZZZZZZ		10	17:36		
ZZZZZZ		10	17:41		
CCV		1	17:45 AL	CA	FE PB MG
CCB		1	17:50 AL	CA	FE PB MG

Katahdin
ANALYTICAL SERVICES

ACCREDITED IN ACCORDANCE WITH nelac
Cert No E87604

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG123412	SM2540	01-MAY-13	30-APR-13	U 1 %	1 %	N/A

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG123412-2	LCS	WG123412	01-MAY-13	30-APR-13	%	90	91.	101	80-120	

location_id	easting	northing	coordinate_system	location_type	location_status	site
OU4-M12-1S	2799628.33	90277.86	NAD 1983 SPCS Maine West (Feet)	SS	ACTIVE	MONITORING STATION-12
OU4-M12-2S	2799605.33	90280.68	NAD 1983 SPCS Maine West (Feet)	SS	ACTIVE	MONITORING STATION-12
OU4-M12-4S	2799439.75	90304.12	NAD 1983 SPCS Maine West (Feet)	SS	ACTIVE	MONITORING STATION-12

aoc	ou	swmu	bldg	area	ground_surface	vertical_datum	survey_date
MS-12	4						
MS-12	4						
MS-12	4						

location_id	site	aoc	ou	swmu	bldg	sample_id	sample_date	qc_type
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-1S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-1S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-2S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-2S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM
OU4-M12-4S	MONITORING STATION-12	MS-12	4			OU4-SS-M12-4S	20130426	NM

matrix	sacode	parameter	cas	fraction	val_res	val_qual	qual_code	units	detect	sdg	phase	source
SO	NORMAL	ACENAPHTHYLENE	208-96-8	PAH	12	U		UG/KG	N	SG2820		TTN
SO	NORMAL	ANTHRACENE	120-12-7	PAH	6700			UG/KG	Y	SG2820		TTN
SO	NORMAL	BENZO(A)ANTHRACENE	56-55-3	PAH	5800			UG/KG	Y	SG2820		TTN
SO	NORMAL	BENZO(A)PYRENE	50-32-8	PAH	1400	J	NP	UG/KG	Y	SG2820		TTN
SO	NORMAL	CHRYSENE	218-01-9	PAH	6400			UG/KG	Y	SG2820		TTN
SO	NORMAL	DIBENZO(A,H)ANTHRACENE	53-70-3	PAH	400	J	L	UG/KG	Y	SG2820		TTN
SO	NORMAL	FLUORANTHENE	206-44-0	PAH	31000			UG/KG	Y	SG2820		TTN
SO	NORMAL	FLUORENE	86-73-7	PAH	4500			UG/KG	Y	SG2820		TTN
SO	NORMAL	LEAD	7439-92-1	M	3520	J	F	MG/KG	Y	SG2820		TTN
SO	NORMAL	PYRENE	129-00-0	PAH	16000			UG/KG	Y	SG2820		TTN
SO	NORMAL	TOTAL SOLIDS	TTNUS046	MISC	74			%	Y	SG2820		TTN
SO	NORMAL	ACENAPHTHYLENE	208-96-8	PAH	130			UG/KG	Y	SG2820		TTN
SO	NORMAL	ANTHRACENE	120-12-7	PAH	2100	J	P	UG/KG	Y	SG2820		TTN
SO	NORMAL	BENZO(A)ANTHRACENE	56-55-3	PAH	3400			UG/KG	Y	SG2820		TTN
SO	NORMAL	BENZO(A)PYRENE	50-32-8	PAH	2100	J	P	UG/KG	Y	SG2820		TTN
SO	NORMAL	CHRYSENE	218-01-9	PAH	3400			UG/KG	Y	SG2820		TTN
SO	NORMAL	DIBENZO(A,H)ANTHRACENE	53-70-3	PAH	210			UG/KG	Y	SG2820		TTN
SO	NORMAL	FLUORANTHENE	206-44-0	PAH	8400			UG/KG	Y	SG2820		TTN
SO	NORMAL	FLUORENE	86-73-7	PAH	1500	J	P	UG/KG	Y	SG2820		TTN
SO	NORMAL	LEAD	7439-92-1	M	723	J	F	MG/KG	Y	SG2820		TTN
SO	NORMAL	PYRENE	129-00-0	PAH	6500			UG/KG	Y	SG2820		TTN
SO	NORMAL	TOTAL SOLIDS	TTNUS046	MISC	76			%	Y	SG2820		TTN
SO	NORMAL	ACENAPHTHYLENE	208-96-8	PAH	100			UG/KG	Y	SG2820		TTN
SO	NORMAL	ANTHRACENE	120-12-7	PAH	6400			UG/KG	Y	SG2820		TTN
SO	NORMAL	BENZO(A)ANTHRACENE	56-55-3	PAH	10000			UG/KG	Y	SG2820		TTN
SO	NORMAL	BENZO(A)PYRENE	50-32-8	PAH	7500			UG/KG	Y	SG2820		TTN
SO	NORMAL	CHRYSENE	218-01-9	PAH	11000			UG/KG	Y	SG2820		TTN
SO	NORMAL	DIBENZO(A,H)ANTHRACENE	53-70-3	PAH	890	J	P	UG/KG	Y	SG2820		TTN
SO	NORMAL	FLUORANTHENE	206-44-0	PAH	26000			UG/KG	Y	SG2820		TTN
SO	NORMAL	FLUORENE	86-73-7	PAH	3700			UG/KG	Y	SG2820		TTN
SO	NORMAL	LEAD	7439-92-1	M	2190	J	F	MG/KG	Y	SG2820		TTN
SO	NORMAL	PYRENE	129-00-0	PAH	24000	J	C	UG/KG	Y	SG2820		TTN
SO	NORMAL	TOTAL SOLIDS	TTNUS046	MISC	59			%	Y	SG2820		TTN

location_status	depth_status	top_depth	bottom_depth	depth_units	collection_method	anal_method	ground_surface	result_note
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	6010C	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	SM 2540B	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	6010C	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	6	IN	COMPOSITE	SM 2540B	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	6010C	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	8270D-SIM	-9999	
ACTIVE	NORMAL	0	3	IN	COMPOSITE	SM 2540B	-9999	

ATTACHMENT 4

PHOTOGRAPHS FROM SEDIMENT REMOVAL FOR BUILDING 178 RENOVATION PROJECT

PHOTOGRAPHS 1 - 4: APRIL 26, 2013 CONFIRMATION SAMPLING INSIDE BUILDING 178

1. Photograph taken facing south of Area 1 on April 26, 2013. Shows the area with soil for NE and SE composite sampling locations for sample OU4-M12-1S on the left and concrete to the right. Although a photograph of Area 2 is not available, the conditions looked similar to Area 1.

2. Photograph taken facing north of Area 1 on April 26, 2013. Shows the area is mostly concrete in the northern portion of Area 1 and a cutout in concrete where soil is present in southern portion of Area 1.

PHOTOGRAPHS 1 - 4: APRIL 26, 2013 CONFIRMATION SAMPLING INSIDE BUILDING 178

3. Photograph taken facing south of Area 3 on April 26, 2013. Area 3 is mostly concrete and rock.

4. Photograph taken facing south of Area 4 on April 26, 2013. Shows that the southern portion of Area 4 is mostly concrete with some cutouts in the concrete with soil. Soil for SW composite sampling location for sample OU4-MS12-4S is to the right of the bay door and the sampler checking for soil depth for the SE composite sampling location can be seen to the left of the bay door.

PHOTOGRAPHS 5 -12: SITE VISIT AND POST-REMOVAL CONDITIONS OUTSIDE OF BUILDING 178

5 and 6. Photographs taken on January 23, 2013. Shows the remaining material after removal of 1 foot of sediment and the material in test pit observed during the site walk. Remaining material consists of gravel, coarse sand, cobble, boulders, and trace silt.

PHOTOGRAPHS 5 -12: SITE VISIT AND POST-REMOVAL CONDITIONS OUTSIDE OF BUILDING 178

7. Photograph taken on February 1, 2013 facing northeast. Shows the remaining material after sediment removal and placement of riprap work surface (to the left).

8. Photograph taken on February 1, 2013 facing east. Shows the remaining material after sediment removal and turbidity curtain surrounding work area. Tracks can be seen in the background.

PHOTOGRAPHS 5 -12: SITE VISIT AND POST-REMOVAL CONDITIONS OUTSIDE OF BUILDING 178

9. Photograph taken on February 8, 2013. Shows protection of the tracks, placement of riprap work surface, turbidity curtain, and cofferdam.

10. Photograph taken on January 31, 2013 facing southwest. Shows the location of the cofferdam and area backfilled with riprap work surface.

PHOTOGRAPHS 5 -12: SITE VISIT AND POST-REMOVAL CONDITIONS OUTSIDE OF BUILDING 178

11 and 12. Photographs taken on February 7, 2013. Show the riprap work surface, cofferdam, and outer turbidity curtain.